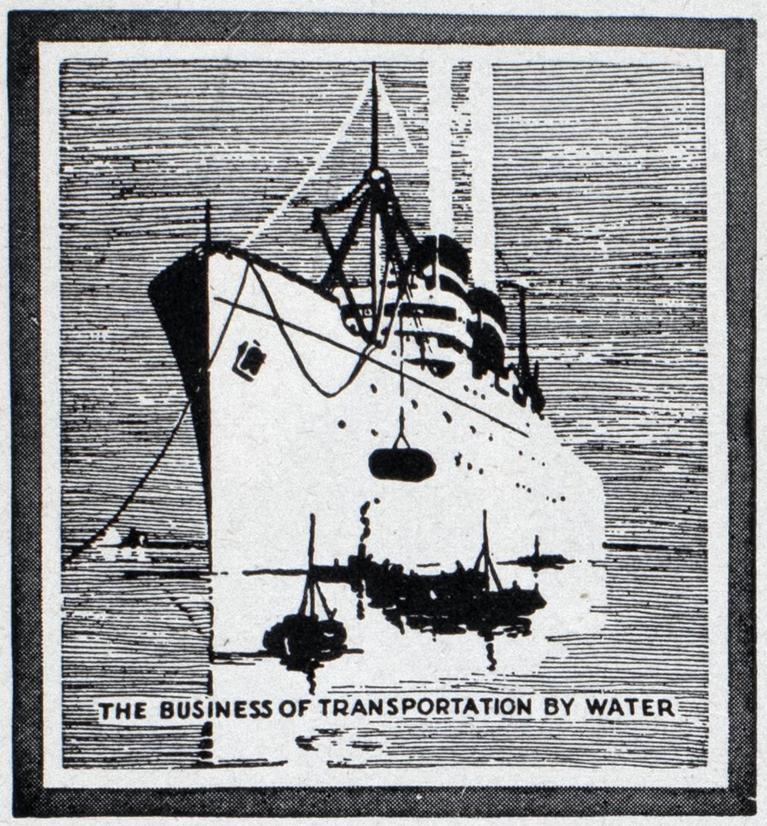
Marine Review

The National Publication Covering the Business of Transportation by Water

CLEVELAND FOUNDED 1878 NEW YORK



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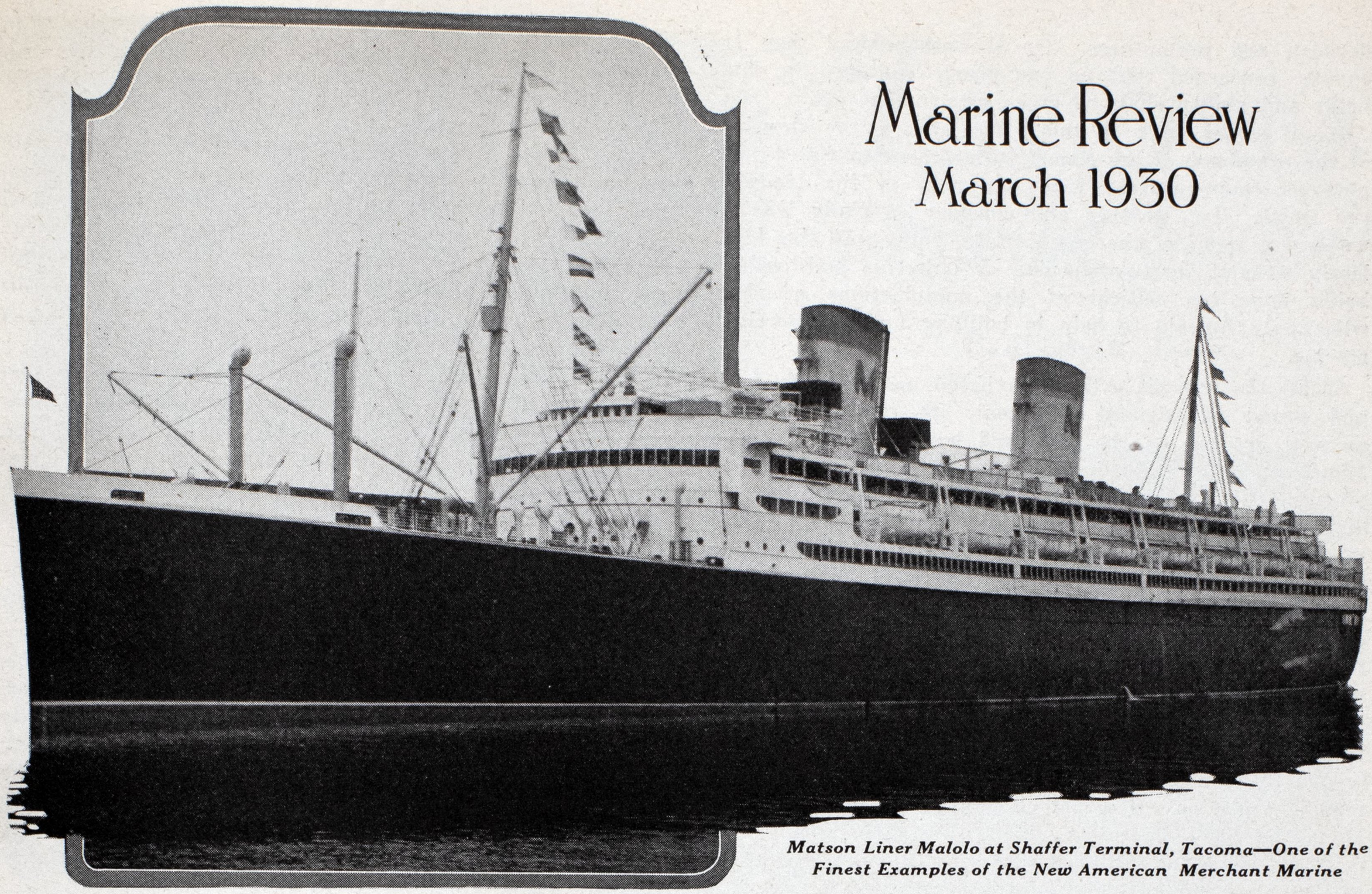
Marine Review
March 1930



Matson Liner Malolo at Shaffer Terminal, Tacoma—One of the Finest Examples of the New American Merchant Marine

Expand American Merchant Marine Along Sound Business Lines

Editorial

IT IS necessary to believe that the government has a plan in executing the provisions of the merchant marine act of 1928, popularly known as the Jones-White law. Concern might reasonably be felt if this were not so, and if any agency of the government having to do with the merchant marine, were giving out a mail contract here, and a construction loan there, more or less at haphazard as applications came in. Where and how is this splendid rejuvenated American merchant marine which the act of 1928 was intended to make a reality to be used for permanent success? Everyone agrees that the law has proven to be one of those remarkably effective documents which now and then are put on the statute books.

There is a feeling among a large group of thinking shipping men—especially those who do not happen to be benefiting by this law that it is working too easily. They are afraid that some of the routes planned, and for which mail pay is liberally awarded, will prove to be failures and that the services can only hope to continue to live on government bounty. Some of these shipping men are also concerned about loaning huge sums to individuals and companies for the construction of elaborate new ships. Foreigners also, who do not look with favor on any attempt of the United States to regain her prestige as a maritime nation, express somewhat the same doubts about this program of mail contracts and construction loans. Many of them feel that it is merely another trial, under a different guise, of government ownership and that it is doomed to failure.

All of this must be seriously considered and we must come back to the idea of a practical plan worked out by, or at least with the aid of, the best shipping brains in the country. All who have the true interests of the American merchant marine at heart are anxious that no unnecessary time be lost in building the new merchant marine, that red tape be minimized, that in this case the government should show that it can act with

decision and promptness. On the other hand they are equally concerned that no one poorly equipped in character and ability shall be given government aid.

It all comes back to this. We are on the threshold of the expansion of the American merchant marine to proportions commensurate with our part in the trade of the world. Let us stop and consider carefully whether we are, as some of the critics state, going into this heedlessly without formulated plan or objective and perhaps being none too critical of the qualifications of those who apply for aid to help in building up this merchant marine.

If all the present activity is based on thorough study and sound experienced judgment, its success is quite as well assured as the best laid human plans may be. Sometimes the truth is annoying and the smug, half pitying attitude of the foreign shipping press and individuals may be far fetched, but it would be well to carefully examine the objectives and plans of those who seek mail contracts and construction loan funds to see that there is a reasonable expectation of permanent success. The integrity and qualifications of those who are to execute these feasible plans toward a definite objective must be above criticism.

There is another important feature and that is the continuity of the present government's attitude with reference to furnishing aids under the law to promote the merchant marine. It would be ruinous for instance, aside from the mail contracts should the government suddenly decide to do nothing further to support the efforts of these individuals and companies to build up first class, well found lines. The government should continue to regard their struggles with sympathy and to take every possible practical step to see that competition is met on an equal and fair basis. If a competing line comes in with fast, new and attractive ships, modern in every respect, especially economical in operation, the differential possessed by the American operator in his mail contract might indeed not be sufficient to offset the advantages of the foreigner who, incidentally might also be particularly capable, experienced and energetic.

Plans for Two Super Liners

THE post office department on Jan. 17, issued a request for mail contract bids on a number of routes, among which was the one from New York to Southampton which stipulated that two 28-knot vessels are to be provided within four years. Bids on this particular route were to be received until noon Feb. 25.

On Feb. 12, Paul W. Chapman, president of the United States Lines, Inc. appeared before the shipping board in Washington with plans and specifications for the two super liners called for in the postmaster general's request for bids.

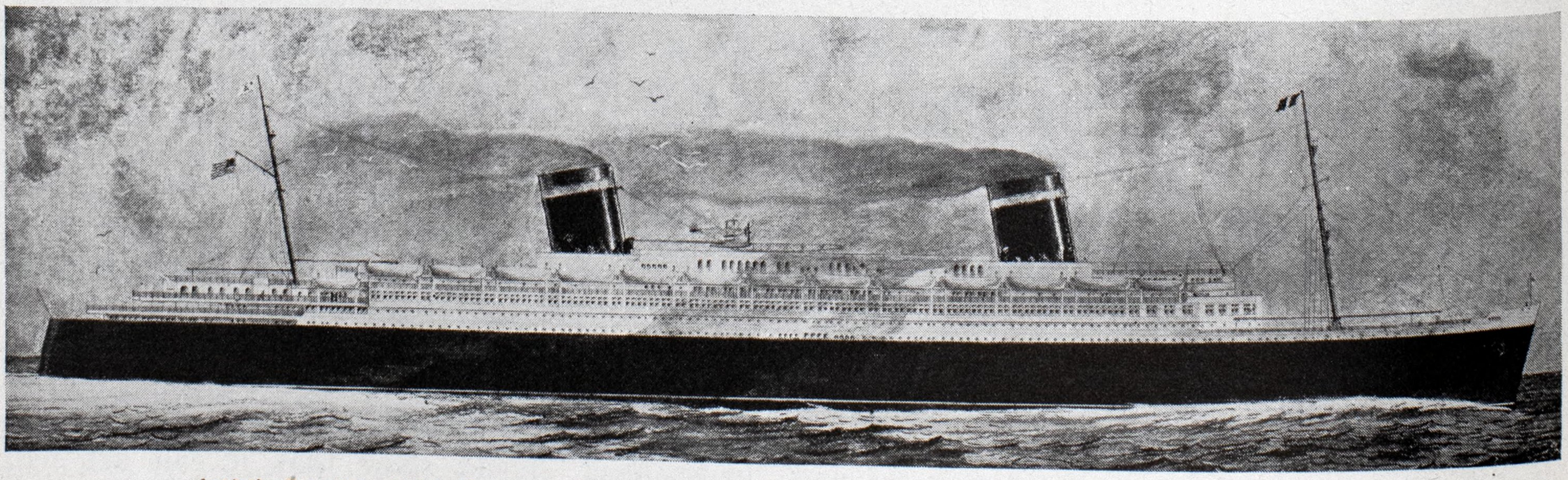
The United States lines has now been under private ownership and operation for nearly one year. Results can be definitely determined. The present personnel can readily be made to show an accounting. The true financial condition of the company can be determined and the physical condition of the ships acquired from the shipping board a little less than a year ago can be fully and accurately gaged.

With all this practical evidence at hand, we hope that by the time this issue is published, the United States lines may have the approval of the postmaster general and the shipping board to carry out the mail contracts and the building and placing in commission of these proposed magnificent 28½-knot super liners to run with the LEVIATHAN in transatlantic service.

This line has shown an energetic and decisive attitude. Theodore E. Ferris of New York was appointed chief naval architect and marine engineer for the proposed new ships prior to the purchase of the line. Due to this action and now that a year has elapsed, in which much work has been done, the line is in a position to promptly place orders for construction if it receives the approval for a mail contract and a loan. In a case like this where it is so easy to determine the real facts, undue delay is inexcusable and will merely mean that the foreign lines will have that much more time in which to build up their trade.

In the planning of these new liners the experience and counsel of an advisory committee, the members of which are the leading naval architects and engineers of the outstanding shipbuilding companies of the country have been made full use of. A thorough study has been made of technical and practical experience abroad. Needless to say, the question of their value as naval auxiliaries has been carefully considered. Model tank tests have been carefully carried out. Safety, speed, comfort and original artistic achievement are assured in these plans.

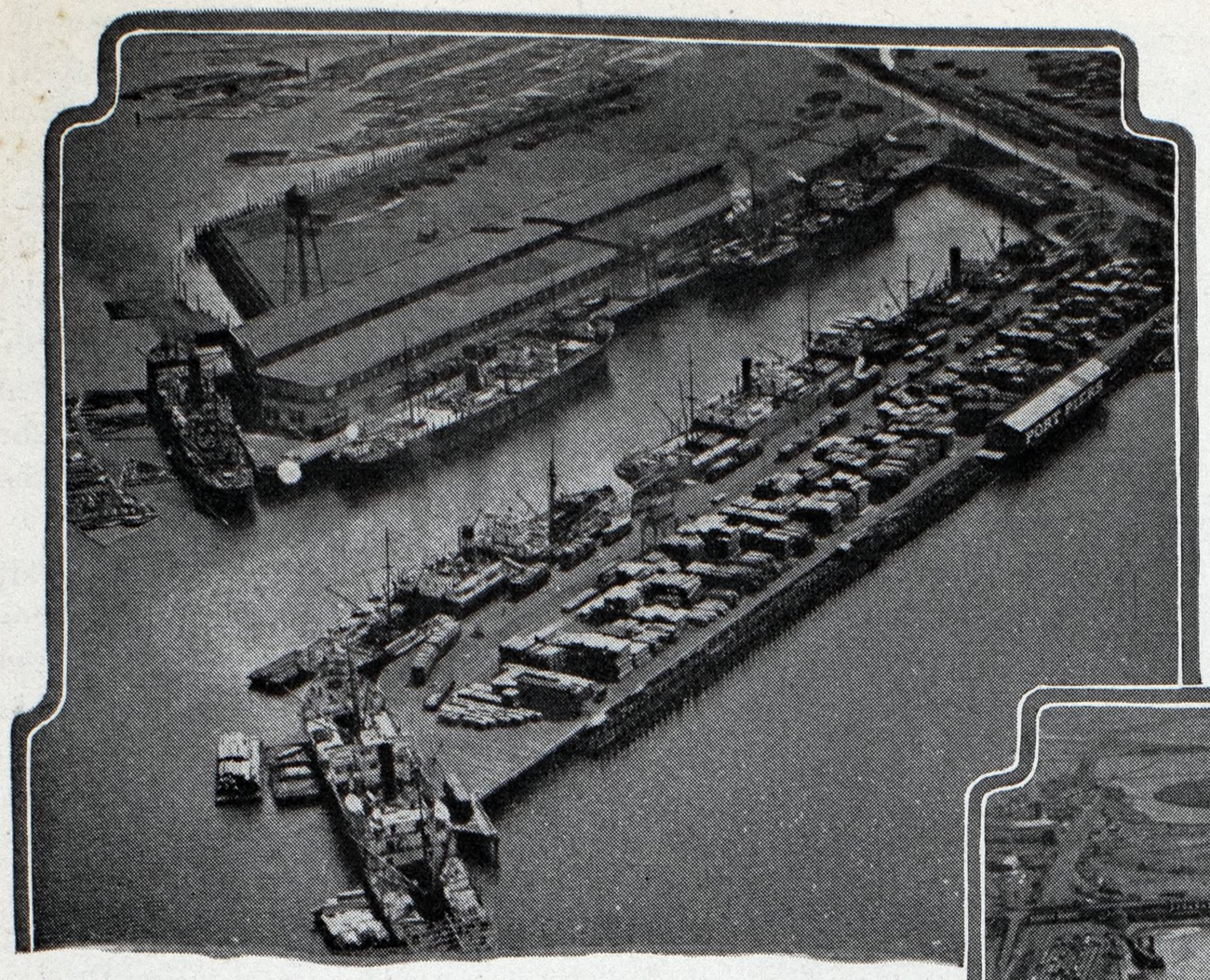
The proposed vessels are to be in excess of 50,000 gross tons and will have a length of 962 feet and a beam of 107 feet 6 inches. They will be of streamline design with bulbous bows and semi-cruiser stern. A catapult device for airplanes will be installed between funnels, so that a ship-to-shore air mail service may be regularly established. It is expected that they will be somewhat faster than the fastest vessel now on the Atlantic and that the run from New York to Cherbourg will be made in considerably less than five days.



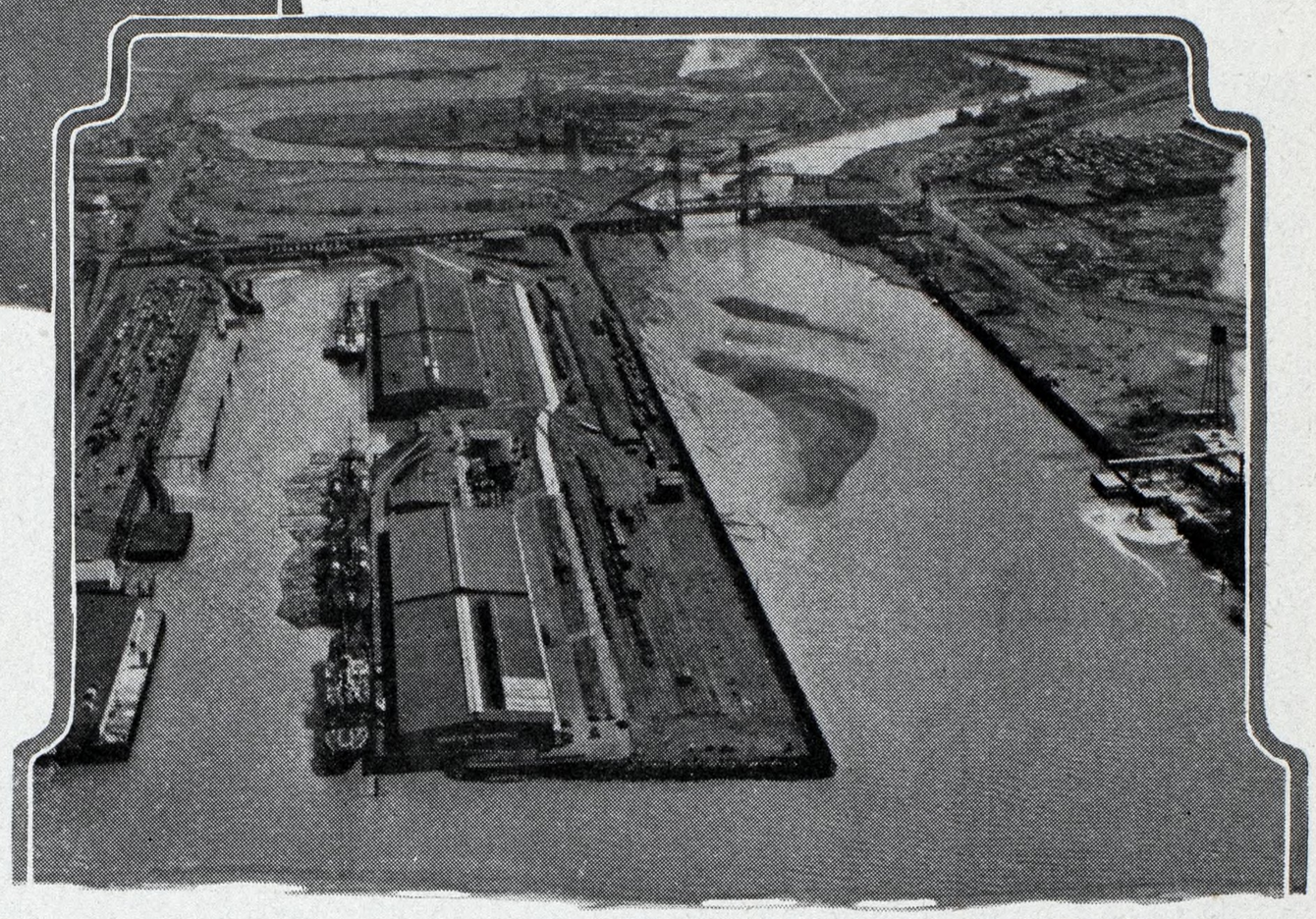
Artist's Drawing of the Proposed Transatlantic Liners for the United States Lines—Sea Speed 28½ Knots

TACOMA
Growing Seaport

By Carey E. Janes



Airplane View of the Port of Tacoma—Seven Deep Water Ships Loading Lumber, Logs, Grain and Miscellaneous Cargo for Ports of the World



Airplane View of Shaffer Terminals No. 2, Tacoma—Central Section of the Tideflats Industrial District

FIFTY years ago, Tacoma was a village. Today it is a city with a metropolitan area containing a population of more than 130,000. Fifty years ago, Tacoma's maritime commerce was limited to the rare visit of a windjammer with supplies for the first settlers, sent away with a scant cargo of lumber. Today Tacoma carries on a varied business with the ports of the world that amounts annually to nearly 6,000,000 tons carried in the holds of 2000 deep sea ships. These exports and imports are valued at about $175,000,000.

During the first nine months of last year Tacoma exported 1,795,772 tons of freight valued at $72,044,020, more than 90 per cent of which was manufactured in Tacoma. Compare this figure with 1,692,478 tons valued at $84,260,119 which was the export tonnage and value for the entire year of 1928. This comparison will give an idea of Tacoma's growing importance in world commerce.

Tacoma is primarily an industrial city. Its advantages for industry and further industrial development are beckoning varied manufacturing enterprises as rapidly as the real and potential markets of the West coast and the Orient are recognized.

The first industry was a sawmill, around which the first settlement sprang up. Back from a beautiful harbor spread billowing forests of fir, hemlock, cedar and spruce, broken only by the rivers that cut their way to Puget sound from the snowcapped heights of the Cascade range and that gigantic peak Tacoma, as the Indians called it, or Rainier as it was named by the English, which towers 14,408 feet high, only fifty miles away.

Became Lumber Capital of America

Small wonder that Tacoma became in time the "lumber capital of America." No estimate has ever been made of the billions upon billions of feet of lumber cut from those forests since Tacoma's first mill began turning out planks and boards. The years have rolled away and yet many billions of feet of timber still stand uncut. Some 39 mills in the Tacoma district alone cut 1,500,000,000 feet of lumber last year.

Such a vast natural resource was certain to interest the railroads. The Northern Pacific was first to make Tacoma its western terminus on Puget sound. It dominated the field alone until early in the present century when the Chicago, Milwaukee, Puget Sound & Pacific, the Great Northern and the Union Pacific also came in to share in the business. The railroads brought industry themselves in that both the Northern Pacific and the Milwaukee built here large car and locomotive repair shops. A railroad car wheel industry also sprang up.

Soft coal was found in abundance in the nearby foothills of the Cascades and ships that burn coal still come to the bunkers in Tacoma harbor. In recent years the big West coast oil companies have obtained waterfront holdings and have set up plants to which their tankers may deliver cargo, available to fuel the oil-burners.

Has a Magnificent Deep Harbor

Tacoma's harbor, Commencement bay, is roughly in the shape of a horseshoe, opening toward the north. It is near the southern end of Puget sound, and 151 nautical miles from Cape Flattery, the entrance to the Strait of Juan de Fuca from the Pacific ocean. Wide deep channels all the way from Flattery to Tacoma make navigation easy and safe. The city is 400 miles nearer Yokohama than San Francisco and by rail is 200 miles nearer Chicago.

The harbor is four and one-half miles wide at its mouth, averages more than two miles in width, has no obstructions of any kind between the entrance and the various pierheads and has ample depth of water for the largest ocean vessel; in fact, officers of the United States navy determined that the huge airplane carrier LEXINGTON

could be safely moored at the docks.

The harbor is well protected and 99 per cent of all ships entering the harbor dock under their own power without the aid of tugs. Practically all docks on the west side of the harbor are built parallel to the shore. The eastern shore of the harbor has not yet been put under commercial development.

The southern shore is the reconstructed delta of the muddy Puyallup river, a stream that has its origin in the glaciers of Mount Tacoma. Its almost level valley back from the harbor for several miles was for untold time a tideland area until the white man took hold and began shaping the scene to suit himself.

The river that for centuries had been gouging out channels at will was finally put in its place between definite and unchangeable banks. The glacial silt it had been bringing down to the sea was syphoned out to form valuable fills with waterways between.

It is upon this tideland area that Tacoma has built most of its mills and factories. Here, too, it has concentrated much of its port development. The two-mile front has been dredged and filled to form many more miles of port frontage for the city's ocean commerce.

The principal development is that of the Port of Tacoma, a 280-acre modern terminal municipally owned and operated. In addition to the transit sheds and open storage of the port itself, land here has been leased to manufacturing concerns.

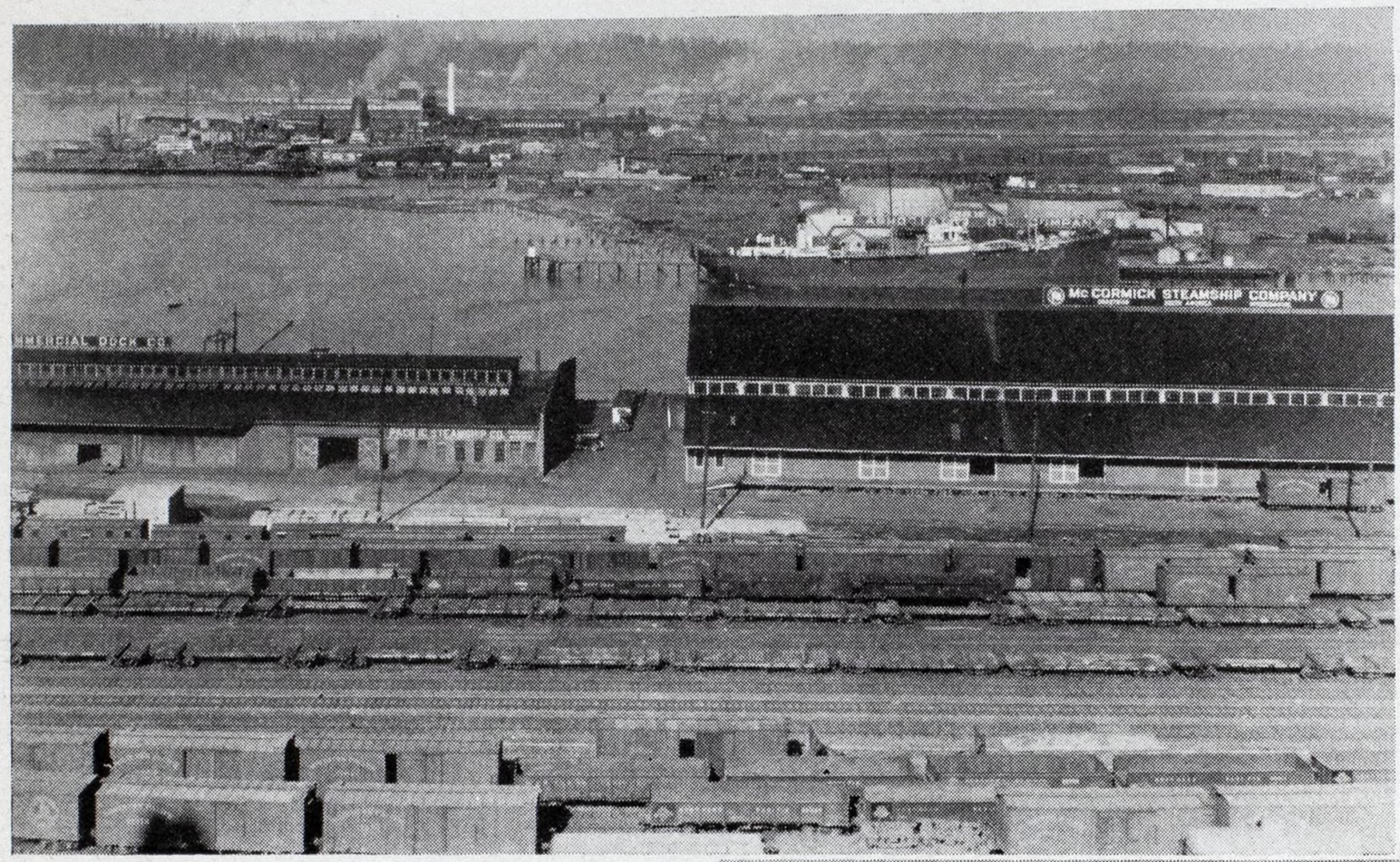
From east to west, this tideland area is indented by waterways known successively as the Hylebos waterway, Wapato waterway, Sitcum waterway, Puyallup waterway, Milwaukee waterway, Middle waterway and City waterway, this last being the longest, widest and deepest of the lot. It parallels the shore line right at the foot of the business district of the city.

All of these waterways are open to ocean vessels excepting the Puyallup waterway which is navigable only to small tugs and craft of little draft. Adequate depths of water at low tide are maintained for cargo carriers in all of the other channels indenting the harbor line. The open harbor has no shoals yet there is ample space for anchorage without going too deep for it, on either side of the bay.

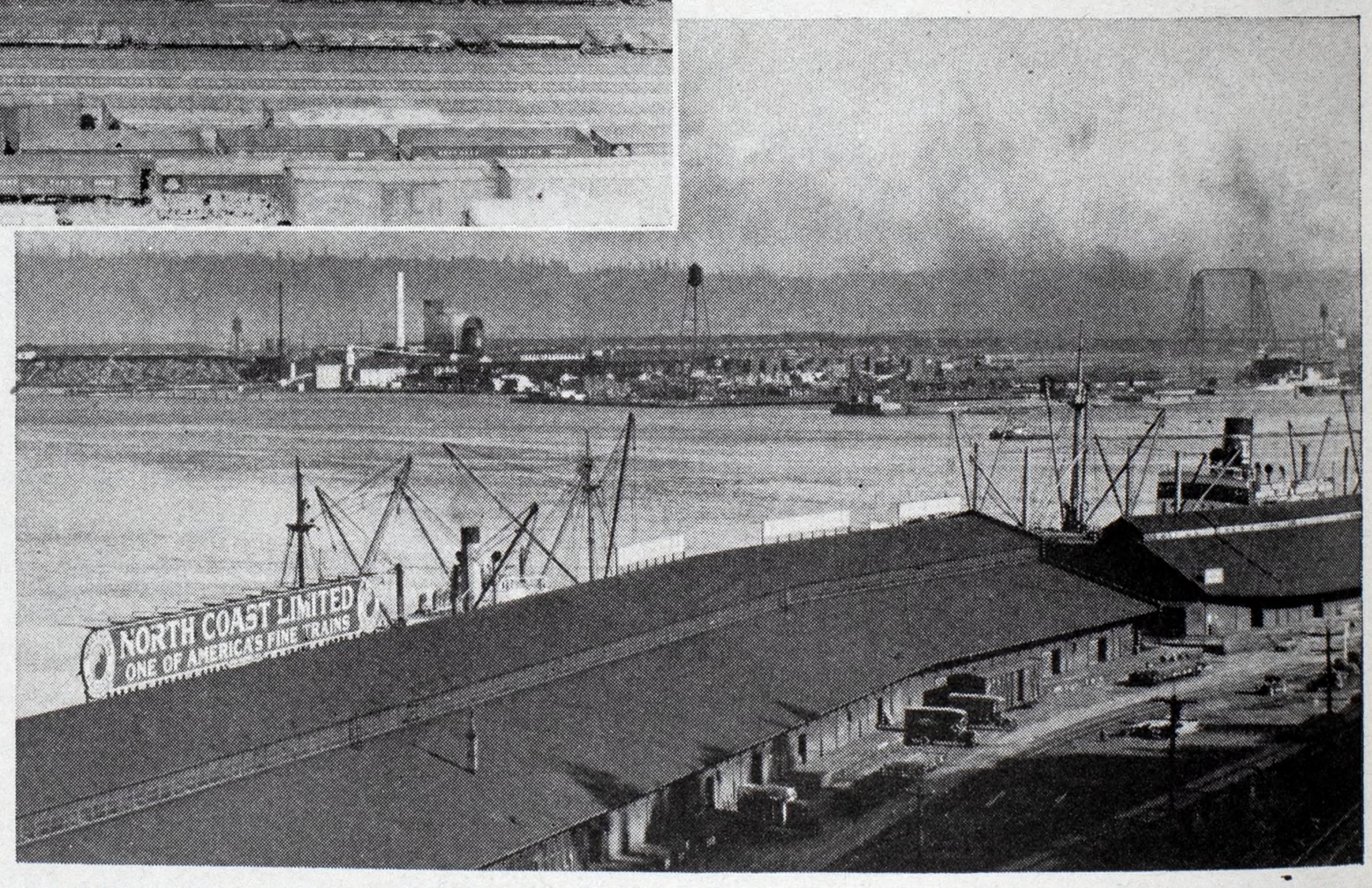
There are 33 principal terminals, 14 of these being open to public use. The remainder are the terminals of individual industries for their own exclusive use. There are 11 big lumber docks all provided with modern handling equipment. There are four docks for grain elevators connected with the milling industries and by next June, the new 500,000 bushel elevator of the Port of Tacoma will be completed. It is now under construction. There are two coaling docks with modern bunkers, three oil docks, two of which, with the most modern equipment, having been completed within the last four years. The port has plans completed for the erection during 1930 of a 1,000,000 cubic foot cold storage plant to serve inland producers and the various refrigerator lines calling at the "Portacoma" piers.

Tacoma early recognized the confusion that might result in her industries from the multiplicity of railroads serving the various terminals and met this problem by a belt line system which the city owns and operates. This provides an efficient intertie between shipside and transcontinental trackage. Most of the larger industries, excepting a few scattered mills, are all in one switching zone served uniformly by the belt line at uniform switching rates which are very low.

One of the important factors in Tacoma's harbor tonnage is the Tacoma smelter of the American Smelting & Refining Co. This big plant, employing 1000 men in day and night operation of its facilities is chiefly designed for the refining of copper. It occupies a site on the "North end" waterfront where it has extensive dockage, enough for several large liners at one time. South America, Alaska, British Columbia and California are the chief sources of the ore shipments brought in by water. Much ore also is brought by rail from inland mines of the Pacific Northwest but the bulk of the ore handled is waterborne. As the copper is refined for market, it is shipped out again by water to the far ports of the world. In 1928, the copper shipments from Tacoma amounted to 136,824 tons



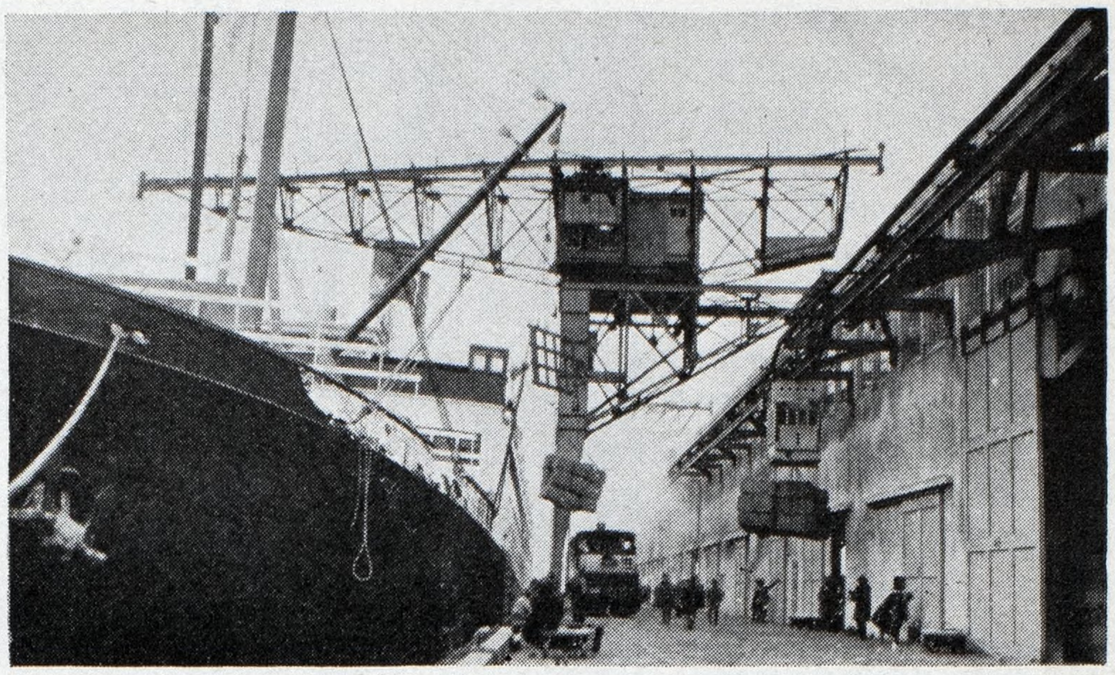
TACOMA, WASH.—LOOKING EAST ACROSS THE INDUSTRIAL ZONE—ASSOCIATED OIL CO.'S TANKER DISCHARGING AT COMPANY'S DOCK—HALF MOON FREIGHT YARDS IN FOREGROUND



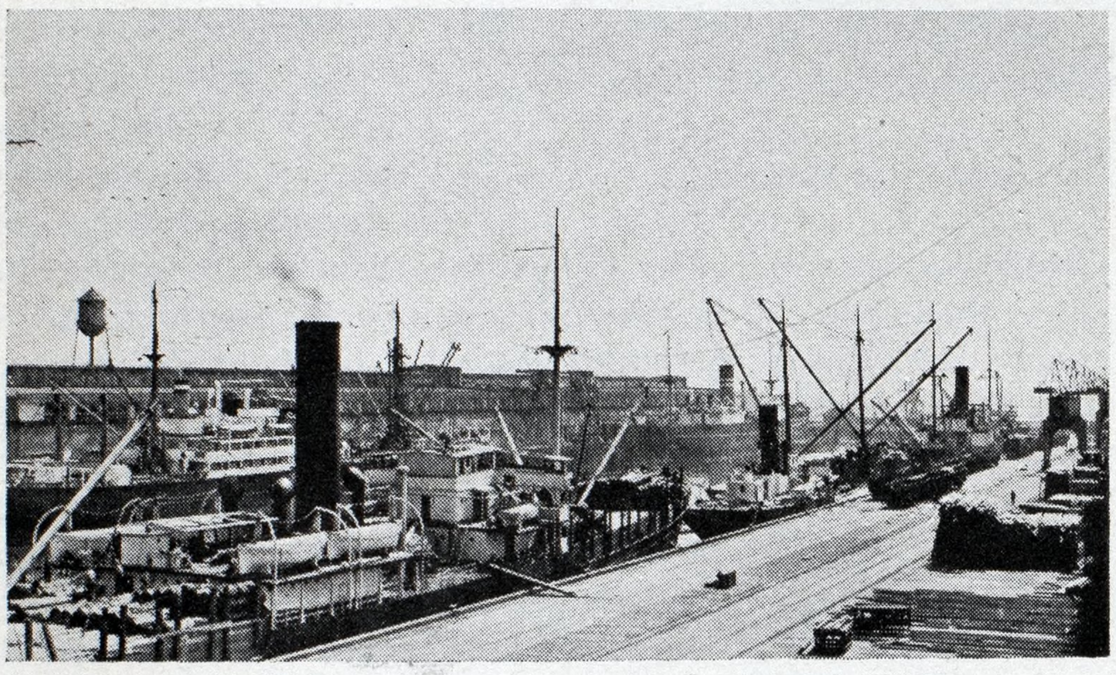
TACOMA, WASH.—LOOKING SOUTHEAST—YARDS AND TERMINALS OF ST. PAUL & TACOMA LUMBER CO. AND PLANT OF UNION PAPER BAG & POWER CORP. IN MIDDLE DISTANCE—PRIVATE DOCKS IN FOREGROUND

Shipping Through the Port of Tacoma

Freighters at Port of Tacoma Piers



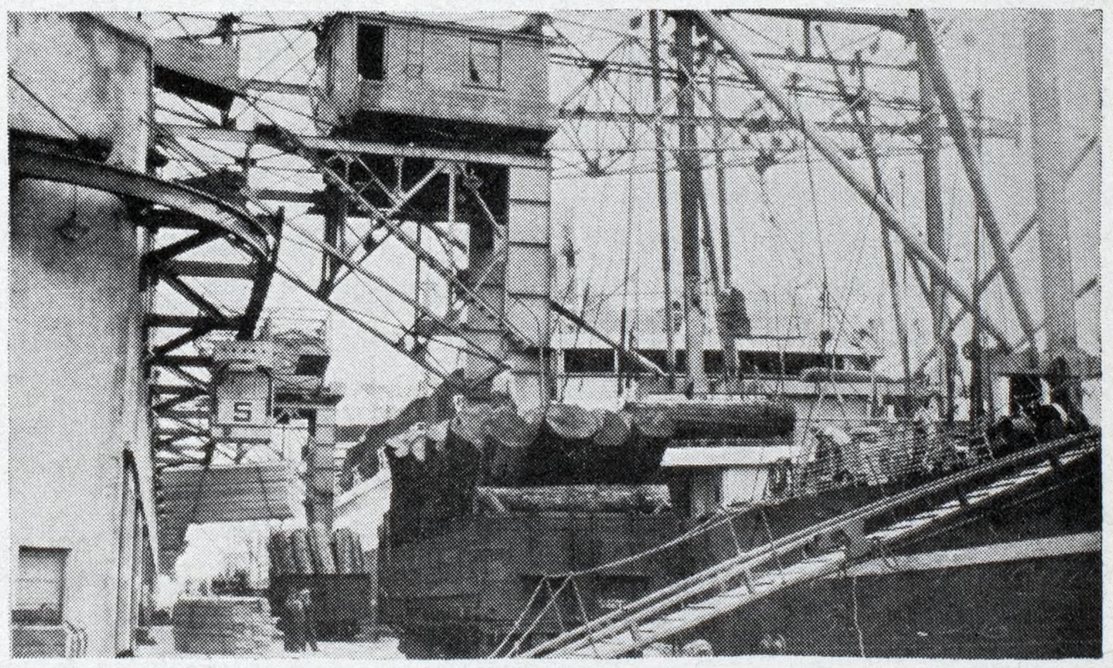
Mechanical Loading Facilities



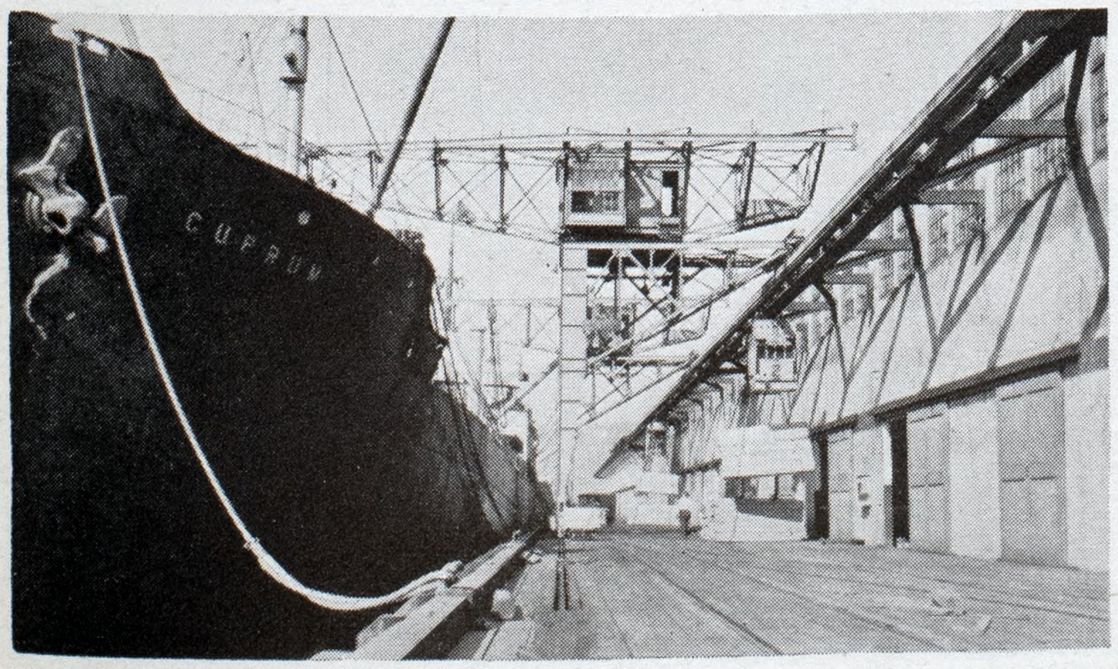
Typical Scene at Port of Tacoma Piers

Loading Lumber from Open Storage and Cars

Grain and Flour for Shipment in Transit Sheds



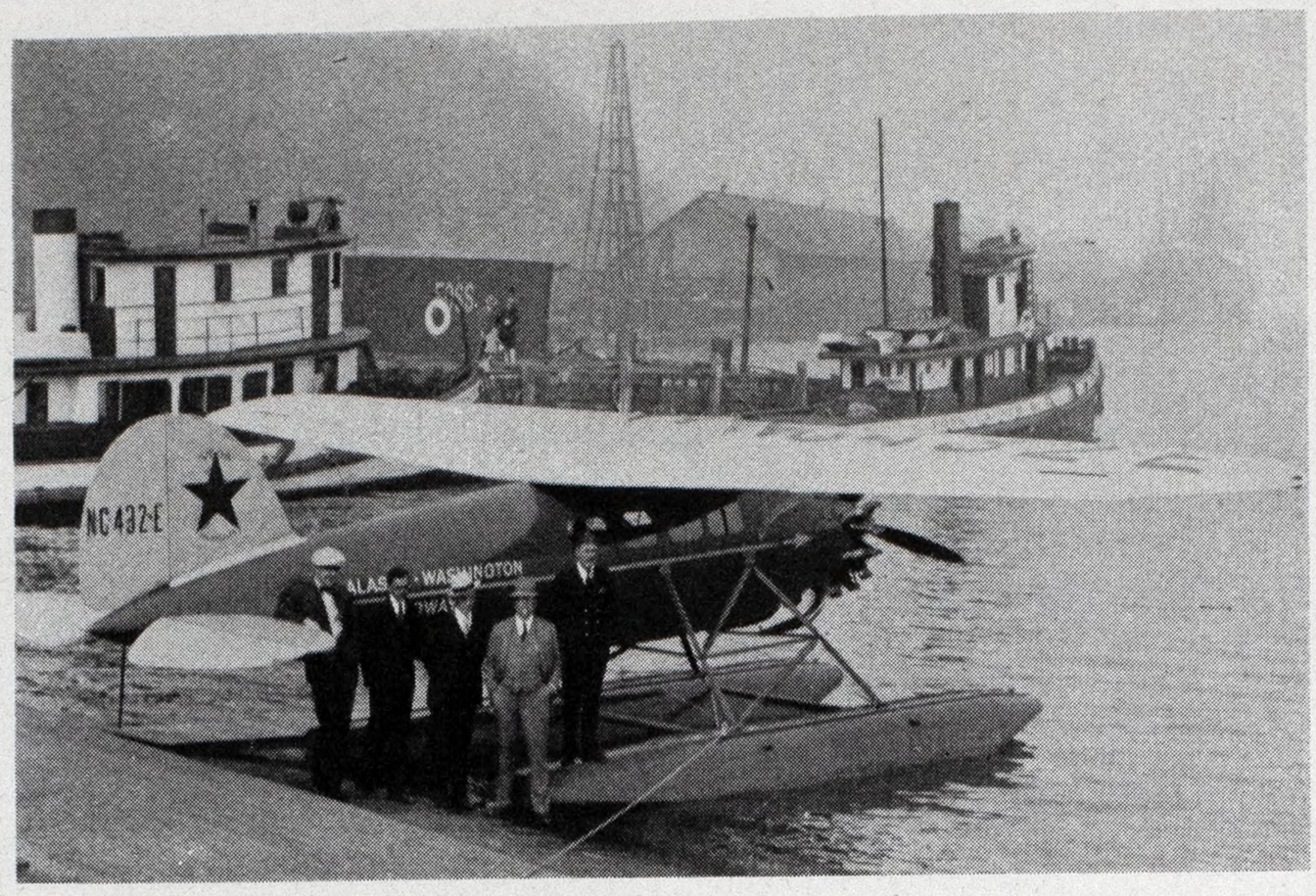
Loading Logs at Shipside, Port of Tacoma



Five-ton Hammerhead Cranes and Monorail

Group of Freighters Taking Cargo

valued at $38,000,000. Imports of ores, concentrates and copper blisters for refining in 1928 amounted to 427,000 tons valued at $25,817,000. Lumber, the port's outstanding commodity, was exported during 1928 in the amount of 671,461,678 board feet valued at $13,000,000. These figures are for waterborne shipments and do not include large quantities sent inland by rail. The figures do include manufactured lumber such as box shook and lath practically all produced in Tacoma plants. However, the Tacoma output of 4,142,279 wooden doors, plywood, millwork and furniture factory products are not included. Grain and grain products shipped from Tacoma harbor in the first nine months of 1929 amounted to 225,972 tons valued at $13,771,000. The Tacoma flour mills, which grind more flour than any American cities except Minneapolis and Kansas City, produce chiefly for the export trade; China, the West coast of South America and the United Kingdom being the big foreign buyers. They took more than 1,000,000 barrels of Tacoma flour during 1928.



REGULAR SEAPLANE PASSENGER SERVICE IS MAINTAINED BETWEEN TACOMA AND SEATTLE, 26 MILES NORTH, BY ALASKA-WASHINGTON AIRWAYS

Although lumber and its products, grain milling and ore refining are the outstanding industries, Tacoma does not lack diversity in its 600 manufacturing enterprises. The port's exports of home products include for example, packing house products, metal products such as car wheels, boilers, machinery, iron and steel; book and wax paper; matches; eggs, explosives, marble, food products including canned fruits and vegetables and confectionery; hops and malt syrup, soap, pulp and pulp stones.

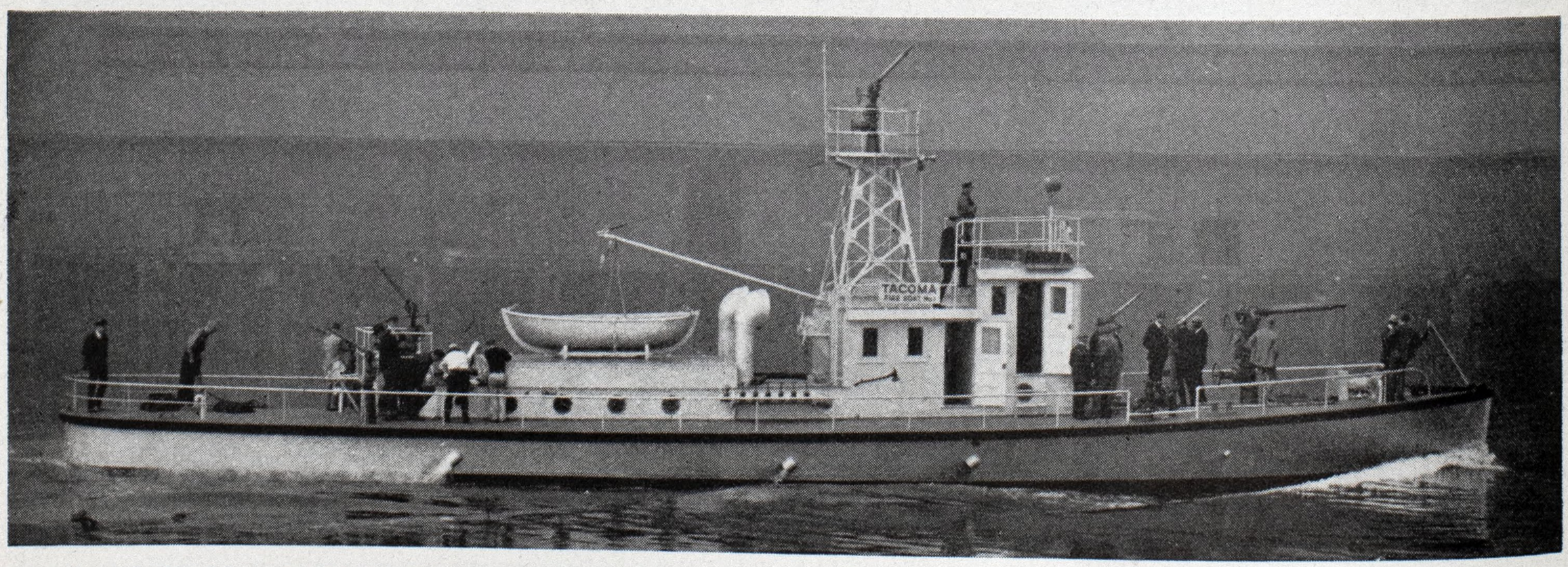
The city has an industrial payroll of approximately $28,000,000 annually, not including more than $1,000,000 a year paid for waterfront labor, and $3,150,000 a year paid to building trades workers.

There are no port or harbormaster's charges imposed in the harbor of Tacoma and there are practically no restrictions of any kind except the rule against the pumping of bilge oil. Due to the great depth and area of the open harbor ballast may be dumped overboard from ships scheduled to load at the local terminals.

Tacoma's advantages for diversified manufacturing on a big scale, apart from those varied raw materials readily available in quantity, may be enumerated simply in the following points:

1. An abundance of electric power at the lowest rate in the United States.
2. An abundance of industrial water at as little as $20 per 1,000,000 gallons, which is exceptionally low.
3. Industrial sites at as low as $1500 per acre, improved.
4. Belt line railroad serving all terminals equitably.
5. Labor supply adequate for all demands.
6. Very mild climate for continuous year-around production.
7. Low general living costs. In its marine services, Tacoma is a regular port of call for seven British lines to the United Kingdom and Europe; nine European lines to Europe; three British lines to the Orient; three American lines to the Orient and Philippine Islands, including one Tacoma-owned line of seven vessels; one American line, two foreign lines to the West coast of South America; two foreign lines to the East coast of South America; one American and two foreign lines to Australia; one foreign line to the East Indies; one foreign line to the Mediterranean; one American and one foreign line to South Africa; seven foreign lines to Japan and the Orient; eleven coastwise lines; fifteen lines operating to North Atlantic ports, three of them calling at Gulf ports, one to the United Kingdom; six lines to Gulf ports only; five lines to Alaska and one to the Hawaiian Islands. No less than 67 lines provide the above regular services.

Tacoma is located only 26 miles from Seattle and while its foreign and intercoastal export tonnage is greater, marine repairs requiring the use of a drydock are done in shipyards at Seattle or Vancouver, B. C.



TACOMA'S NEW $180,000 ALL STEEL FIREBOAT—BUILT IN TACOMA YARDS OF COAST LINE SHIPBUILDING CO.—LENGTH 95 FEET, BEAM 21 FEET, DRAFT 6 FEET, SPEED, 20 MILES PER HOUR—A MODERN EFFICIENT FIRE FIGHTING UNIT

United Dry Docks Adds to Its Facilities

United Dry Docks, Inc., New York, to meet increasing demands upon its tank and miscellaneous steel construction facilities, is erecting two buildings, 60 x 513 feet, at Arlington, Staten Island, N. Y.

The new plant is especially designed for mass production of riveted and welded steel construction of all kinds, including high and low pressure tanks, for marine and other purposes, steam boilers of the gas fire heating boiler, tubular and vertical types, as well as smoke stacks, breeching, structural steel, large pipe lines, dryers, rotary coils and other equipment. Facilities are available also for lead lining of tanks, and manufacture of heavy Scotch boilers, oil burners, iron, brass and aluminum castings, pipe work, sheet metal and copper work.

In order to increase its ship repair facilities in the north river, United Dry Docks, Inc., soon will install a 10,000 ton dry dock at its Fletcher plant in Hoboken, N. J. The dock will be transferred from the company's plant at Rosebank, Staten Island, which recently was sold and will be placed in operation April 1, beside the 8500-ton dock now in use at the Fletcher plant. The new dock, one of the five-section type built by the shipping board, is 462 feet long overall and 117 feet wide.

United Dry Docks operates a total of 27 docks at its six plants, 14 of them being capable of lifting ocean vessels.

The sales department is managed by Harry Lindemann, 11 Broadway. James Clute, Jr., is operations manager at the plant.

Port Authority Honored

For services in connection with the recent port and ship canal developments in Belgium, His Majesty, Albert I, King of the Belgians, has conferred, at the New Year Day promotions, the Order of Leopold II, grade of officer, upon Dr. Roy S. MacElwee. Similar honors previously received for port and harbor work, are: Polonia Restituta, grade of officer, from Poland; Commander, Crown of Rumania; Chevalier, Crown of Italy. Dr. MacElwee was director of the bureau of foreign and domestic commerce in the Wilson administration, and for the past several years has been commissioner of port development of the city of Charleston, S. C. His writings upon port development and terminal subjects are standard.

The firm of MacElwee and Crandall Inc., industrial and civil engineers, has just been established with head office at Cambridge, Mass. This new firm will specialize as consulting engineers in all matters of lake, river and ocean waterfront development, port and port city planning and zoning, industrial and traffic surveys and plant location reports. Mr. J. Stuart Crandall is the fourth generation of a line of civil engineers and is treasurer of the Crandall Engineering Co., Cambridge, Mass., builders of floating and railway dry docks.

To Hold Annual Meeting

The Institution of Naval Architects is to hold its seventy-first annual meeting Wednesday April 9 and the two days following in the Luxury hall of the Royal Society of Art, John Street, London. The president of the association, the right honorable Lord Webster Wemyss, admiral of the fleet, will preside over the meeting. This institution represents the highest technical achievements of Great Britain.

Europa Is Ready for Trial Run

The new North German Lloyd liner EUROPA, sistership of the BREMEN, will run her three-day trial trip from Hamburg, during the week of Feb. 23. The installation of the propulsive machinery has been completed and tests and adjustments made to insure readiness and smooth operation of the powerful turbines, capable of developing over 100,000 horsepower during the three day trial trip in the North sea.

The finishing work in all departments of the EUROPA is being carried forward without interruption and the public rooms and staterooms are practically ready for the painters and decorators.

The EUROPA sails from Bremen, on March 19 on her maiden voyage to New York, where she is due March 25. In exterior appearance and motive equipment, she is almost an exact counterpart of the BREMEN. Only in interior decoration does she differ from the BREMEN.

Bremen's Lines in Model

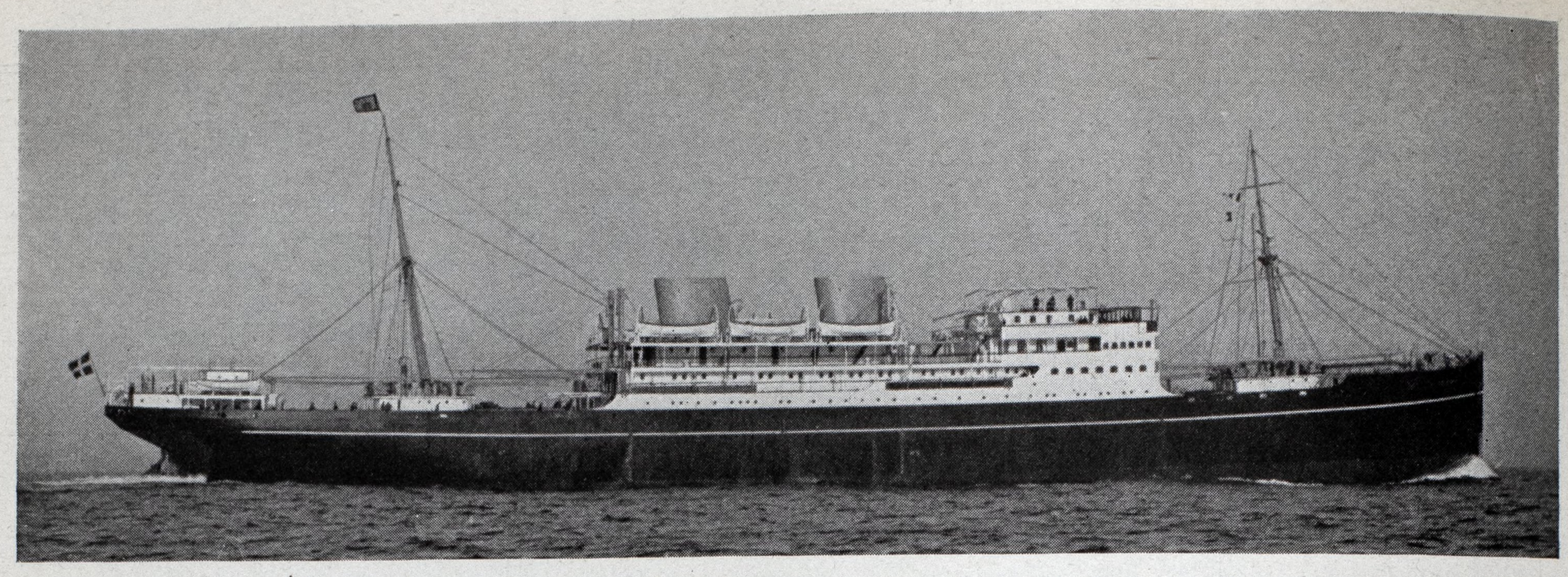
A VISUAL study may now be made of the under-water lines of the famous transatlantic record holder BREMEN, faithfully reproduced in the builder's scale model of this ship recently placed on display in the offices of the North German Lloyd at 57 Broadway, New York city.

This elaborate and costly model, which is 12½ feet long built to a scale of 1 to 75, is complete in every detail from keel to truck. It reveals some of the novel features of hull design, the long stream-like lines which enabled the BREMEN to win the blue ribbon of the ocean by making the Atlantic crossing in 4 days, 17 hours and 42 minutes. Superstructure forms were designed to diminish wind resistance; even the funnels were given the "rain-drop" shaped outer form and help accomplish this purpose.

Departures from traditional naval architecture have been made in the underwater lines to enable the BREMEN to move through her element with a minimum of resistance and yet without any sacrifice in seaworthy qualities and passenger comfort. Thus the blunted hull and bulbous nose present a startling contrast to the sharp stem hitherto considered essential in ship building. The clean entrance lines of the bow are carried much further aft than on any other transatlantic steamship, the sides becoming parallel only at the midship section. The position of the quadruple screws, the lines of the counter run and the modified cruiser stern with the balanced streamlined rudder underneath can be readily examined in the model.

The mail airplane and its catapult are shown in the launching position on the uppermost deck. The great amount of deck space available for sports and recreation for the passengers of the various classes is clearly demonstrated. Various essentials for navigation, operation, safety and communication are distinctly shown and present an interesting study. These include faithful replicas of the bridge, instruments, search lights, life boats, ground tackle, radio equipment and other features.

The model has been placed in the center of the passenger department of the Lloyd offices, where it becomes not only an interesting exhibit for those connected with maritime affairs, but enables passengers when booking, to have a visible demonstration before them of the location of their rooms and the many other facilities afforded by the BREMEN.



Passenger and Cargo Motorship Amerika on Trial Trip Jan. 21, 1930. One Double Acting Two Stroke Cycle Engine

Motorship Amerika Completes Trials With New Double Acting Engine

IT IS fitting that the East Asiatic Co. which eighteen years ago sponsored the first ocean-going motorship, the SELANDIA should now accept, for a very fine new ship diesel propelling machinery of a new design. The AMERIKA is equipped with a two-stroke cycle, double acting diesel engine capable of developing 7000 brake horsepower at 95 revolutions per minute, the first of its kind turned out by Burmiester & Wain. Trials of the AMERIKA were held on Jan. 21, in the sound near Copenhagen, beginning at 9:00 a.m. and ending at 6:00 p.m. An average speed of 16.55 knots was obtained during the trial, the corresponding power of the engine being 7670 brake horsepower or 8613 indicated horsepower at 111 revolutions per minute. A test of six hour's duration with the main engine developing 6450 brake horsepower gave a consumption of .37 pound of fuel per brake horsepower per hour for all purposes. From previous experience it is expected that the efficiency of the engine fully run in during actual service will increase about four per cent.

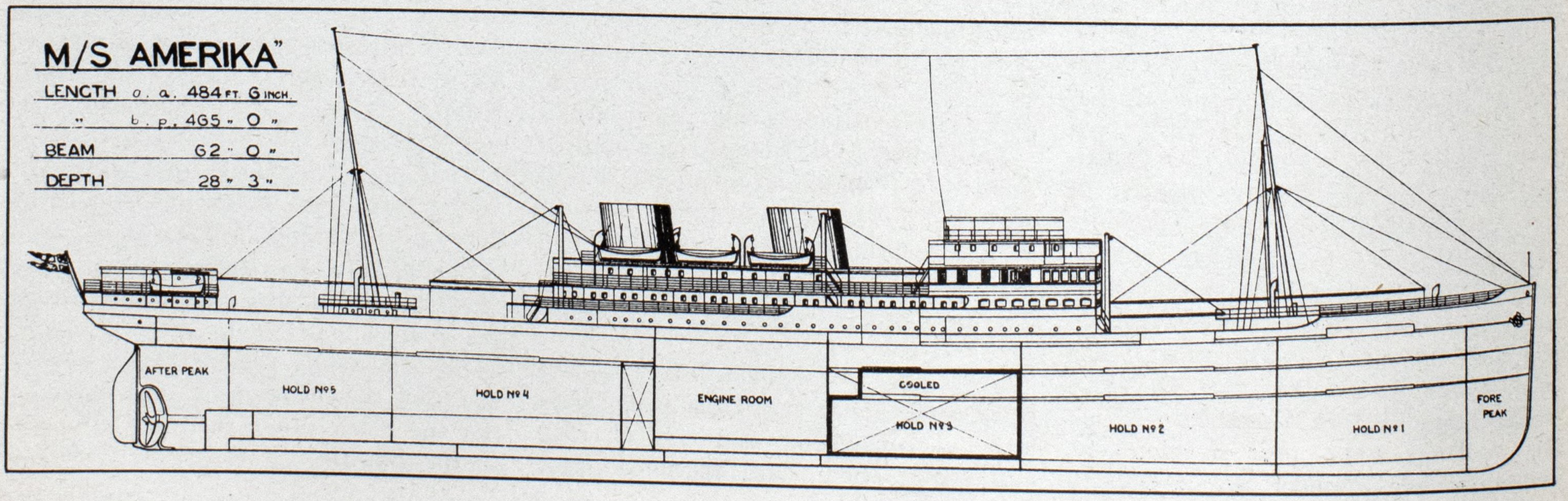
Maneuvering during the trials showed easy starting, ahead and astern, the engine running quietly up to full speed without any vibration. At maximum speed the movement could scarcely be felt, although the vessel was light. The trials were considered a complete success in every respect, and were attended by representatives of the owner, the builder, and Lloyds in which the vessel is registered to the highest class. There were also present representatives of the Blue Funnel line, United States Steamship Co., Swedish American line, the Norwegian American line, Bergen Steamship Co., and the Linea Sud Americana. On Jan. 23, the AMERIKA sailed on her maiden voyage to Bangkok from which she will sail to the Far East. From Japan she will proceed to the Pacific Coast to load homeward.

Though of special interest in the type of her propelling machinery the AMERIKA is in many other respects a fine modern vessel. She is one of the world's largest ships with a single screw and has been built as a combined passenger and cargo vessel with especially attractive and comfortable accommodations for 52 first class pas-

Machinery Weights

Main engine	360
Diesel generators	75
Scavenging blowers and auxiliaries	75
Reservoirs, silencers, spares and tools, auxiliaries for ships use etc. inventory, workshops, etc.	108
Shafting	100
Boiler plant	8
Electrical equipment for engine room, floors, ladders, etc., piping	120
Total, tons	846

NOTE: This gives a weight for the complete installation of 54.4 pounds per brake horsepower and for the main engine only, of 23.4 pounds per brake horsepower.



sengers. This vessel of complete superstructure type is particularly adapted to the Pacific trade. The principal dimensions are: Length overall, 483 feet 3 inches; length between perpendiculars, 465 feet; breadth molded, 62 feet; depth molded, 40 feet. The single main engine develops 7000 brake horsepower, giving a sea speed of 15 knots loaded. The gross tonnage is 10,100 and the net tonnage is about 6300. The deadweight capacity is 12,000 tons and the total cargo space in cubic feet bale measurement, is 630,000. One of the striking features in appearance is the use of two large funnels. This is a departure for the East Asiatic Co., the ships of which are popularly called the "non-funnel fleet." The forward funnel is used for silencers for the main and auxiliary engine, while the after funnel is a dummy containing water tanks and electric motors for the ventilating system for passenger quarters.

There is a long bridge on the upper deck for the accommodation of officers, space for provisions and the galley. A long forecastle extends to the winch house. Double bottom subdivided into seven watertight divisions into six tanks run the length of the vessel. With the wing tanks at the tunnel side, this space has a capacity in fuel oil of 1800 tons. Fore and after peaks of large size are arranged for water ballast or fresh water. Aft of the engine room is a deep tank also for water ballast. The total water ballast capacity aggregates 2800 tons. The hull itself is divided by seven watertight bulkheads into six spaces, the engine room being number four, so that three of the cargoholds are forward and two aft of the engine space. Number three hold is arranged for refrigerated cargo and has a total capacity of 70,000 cubic feet. This hold is intended for fruit and has been especially fitted for carrying bananas. Cooling is accomplished by blowing in air, the current of which can be altered to suit requirements. Distance thermometers are fitted in the various spaces for observing the temperature. Forward of the engine room a 'tween deck is fitted to minimize the height of the cargohold.

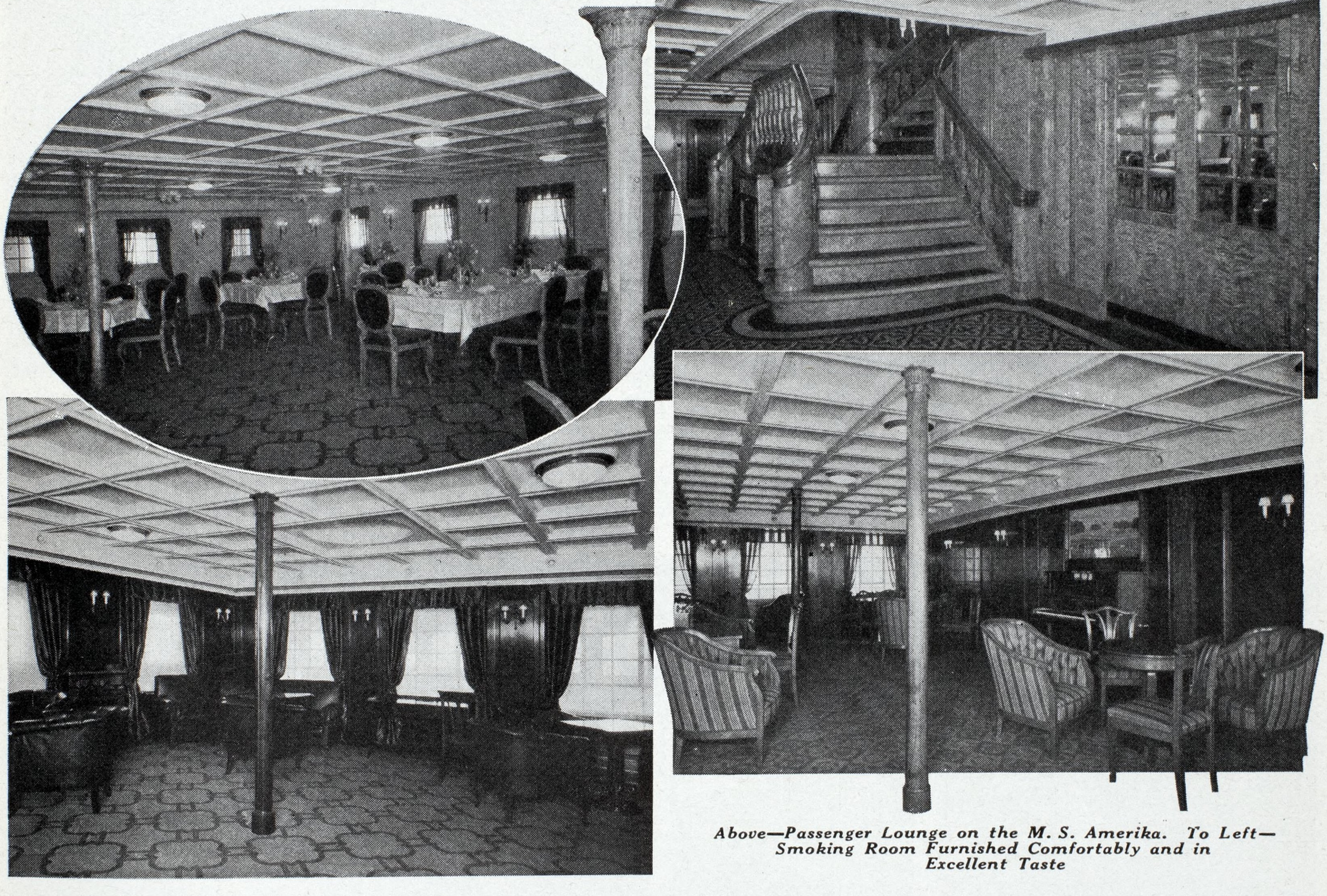
Modern Cargo Handling Localities

Five hatches up to 36 feet in length provide access to the holds. The hatchway to number one hold is carried up to the forecastle deck and for number three hold it is a trunk extending from the main to the promenade deck. Cargo handling appliances are of the latest and most efficient type in order to facilitate the rapid handling of cargo and to meet the exacting conditions of loading and discharging at a great many ports. Winch houses are built around the mast. In this space at the foremost are stored lamps, search lights, paints and boatswain gear. In the house around the main mast are located washing and laundry machines. A portion of this space is also used as a cargo office and for storerooms.

The largest of the holds, numbers two and four are each served by four derricks, two 3-ton and two 5-ton. The remaining holds are served by two 5-ton derricks each. Number two hatch in addition is also provided with a 30-ton derrick for handling heavy weights All of the winches are electrically driven and were made by Thomas B. Thrige of Odense, Denmark.

Sunshade awnings are widely used, particularly above all passenger living quarters which are located in houses above the bridge deck. There are, in all, 24 staterooms to accomodate 48 passengers in the house on the bridge deck, and two staterooms for four

Interior Views of Passenger Quarters on the M. S. Amerika. Below—Dining Room Seating 60 Persons. To Right—Hall and Staircase Leading Up to the Lounge and Smoking Room



Above—Passenger Lounge on the M. S. Amerika. To Left—Smoking Room Furnished Comfortably and in Excellent Taste

passengers in a house on the promenade deck. All staterooms are spacious and airy and are comfortably furnished. Six of the rooms have separate baths, while for the use of other passengers there are several well equipped public bathrooms. The staterooms, without baths are fitted with two washstands with running hot and cold water.

Of the staterooms, 18 are provided with one cot bed and one sofa berth, so that all of these rooms may be used for one or for two according to requirements. The remaining rooms are fitted with two cot beds and one sofa.

Fine Public Passenger Rooms

The dining saloon which is located on the bridge deck forward of the staterooms inpresses the visitor in a bright and cheery way. It is spacious and the wood work is finished in an attractive manner. The ceiling and the panelled walls are decorated in light colors of various shades. The lighting is from the ceiling and from the beautiful bronze bracket lights arranged on the walls between the windows. All the furniture is in polished birch covered with leather. The wall panels at the after end of the saloon are covered with oil paintings by a talented Danish artist. The floor is covered with "ruboleum" tiles and the furniture includes a sideboard with mirror. Broad glass swinging doors lead from the dining saloon into a large hall giving access to staterooms and the deck.

The smokeroom which is located at the forward end of the hall is in dark dull mahogany. The furniture is polished mahogany and the chairs and sofas are covered with leather. Lighting from the ceiling is augmented by neatly finished bronze bracket lights on the walls. On the after end of the smokeroom a decorative electric fire place is arranged, above which is hung a painting by the landscape painter P. Monsted. The windows are large extending almost from the floor to ceiling. They have bronze sashes with small panes of which the center one opens. The floor in the smokeroom is covered by "ruboleum" in suitable patcerns and colors.

The ladies lounge is at the opposite end of the hall, finished in polished cherry wood, and is highly attractive with its elaborate chandeliers in the ceiling and bronze bracket lights on the walls. The windows are similar to those of the smokeroom. The furniture is in polished cherry wood and settees and chairs are covered with hand woven tapistry. The floor is covered with "ruboleum" and soft carpets. From the hall and stairway doors lead to the promenade deck which at the front and sides is closed in by wind screens provided with sliding windows in such a way that the deck outside the smokeroom and ladies lounge is made into a snug verandah.

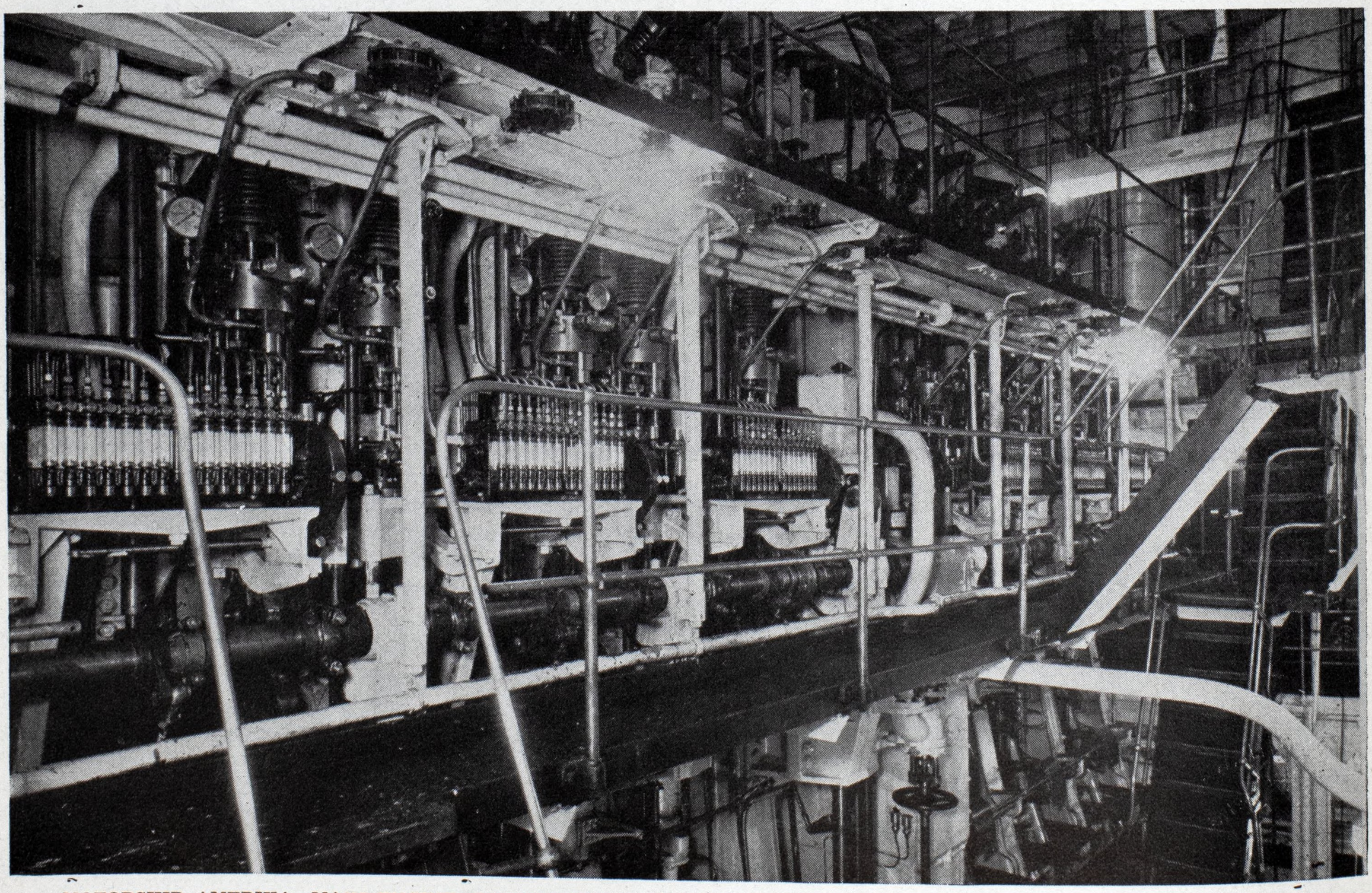
On the after end of the promenade deck are two staterooms in a house which is adjacent to the engine casing. This house contains besides the aerial station a modern barber shop and a nursery communicating with the passenger accommodation by means of an inside stairway. The aerial station is of the newest type with short wave equipment to enable correspondence direct with the home port from all quarters of the world.

Ventilation Given Careful Attention

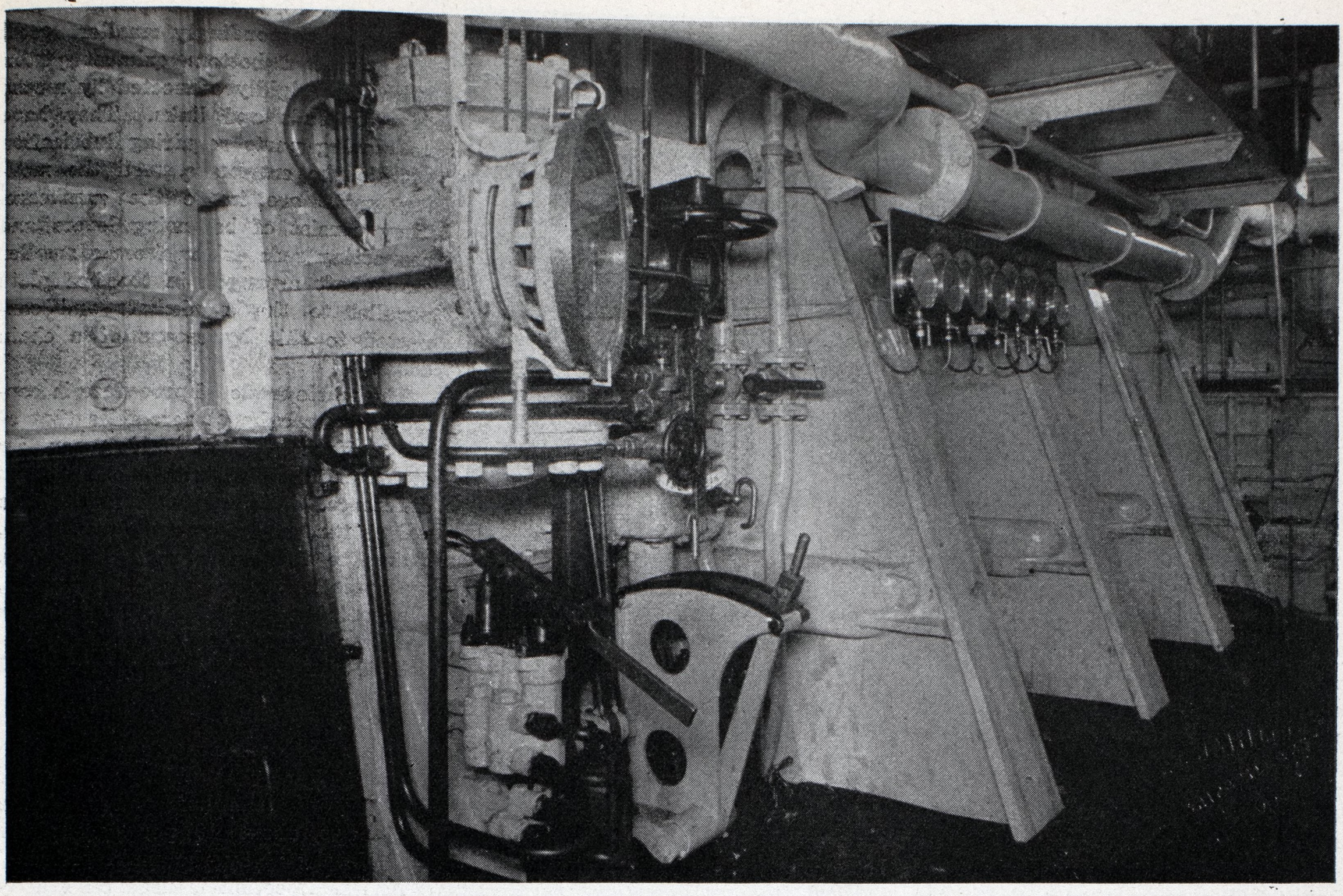
Ventilation to all staterooms, corridors and saloons is obtained by blowing in fresh air and drawing out the foul. Punkah ventilators are fitted above all berths and arranged for operation by the passengers themselves. In the saloons and stairways these punkah ventilators are fitted in connection with rotating fans to avoid disagreeable air currents.

Besides the large and spacious promenade deck all of the boat deck is at the disposal of passengers. Between the funnels is an ideal space for sports. Heavy deck glasses are fitted flush with the deck to give light to the engine room. Ventilation is provided partly by means of vents and partly through openings in the promenade deck.

The navigating bridge is above the



MOTORSHIP AMERIKA—MAIN ENGINE—INTERMEDIATE GRATING—NEW TWO STROKE CYCLE DOUBLE ACTING DIESEL



SIMPLE CONTROL STATION IN THE ENGINE ROOM OF THE MOTORSHIP AMERIKA

saloon house on the promenade deck, where also the accommodations for the captain and deck officers are located. In the same house is the chart room, equipped with all modern instruments for the safe navigation of the ship.

Living quarters for sailors and motormen are aft in a deck house on the upper deck. The rooms are large and airy, and arranged for two men each. Messrooms for the sailors and motormen are located at the after end of the bridge space. In this space there is also a hospital for women as well as men with respective baths and lavatories, also a spacious operating theatre, and a large bright living room for the doctor.

Accommodations for the engineers are located in the bridge. These rooms are large and are furnished in polished mahogany, with walls and ceiling in white lacquer. The ventilation of all rooms and alleyways is especially efficient.

The galley is located in the forward end of the bridge space where also a separate scullery is located. There is a large range and bake oven arranged for all firing. The galley and scullery is equipped with all modern machinery such as dish washers and dough mixing machines. In connection with the galley are large provision rooms of which some are refrigerated, containing separate beer and wine rooms.

The propelling machinery of the AMERIKA represents a new technical development. It consists of one Burmeister & Wain two stroke cycle double acting diesel engine, capable of developing 7000 brake horsepower on one shaft at about 95 revolutions per minute. The engine is of the enclosed forced lubricated type using solid injection. It is provided with separate electrically driven scavenging air pumps of enclosed rotating type.

The thrust bearing is of the Burmeister & Wain plain one collar forced lubricating type fitted as a part of the engine, this being standard practice for small engines, and now for the first time used in machinery of this size.

This particular double acting diesel engine of two stroke cycle principle for propulsion of large ocean going ships is the latest two-stroke engine on the market, and it resembles closely the four stroke double acting engine turned out by the same company.

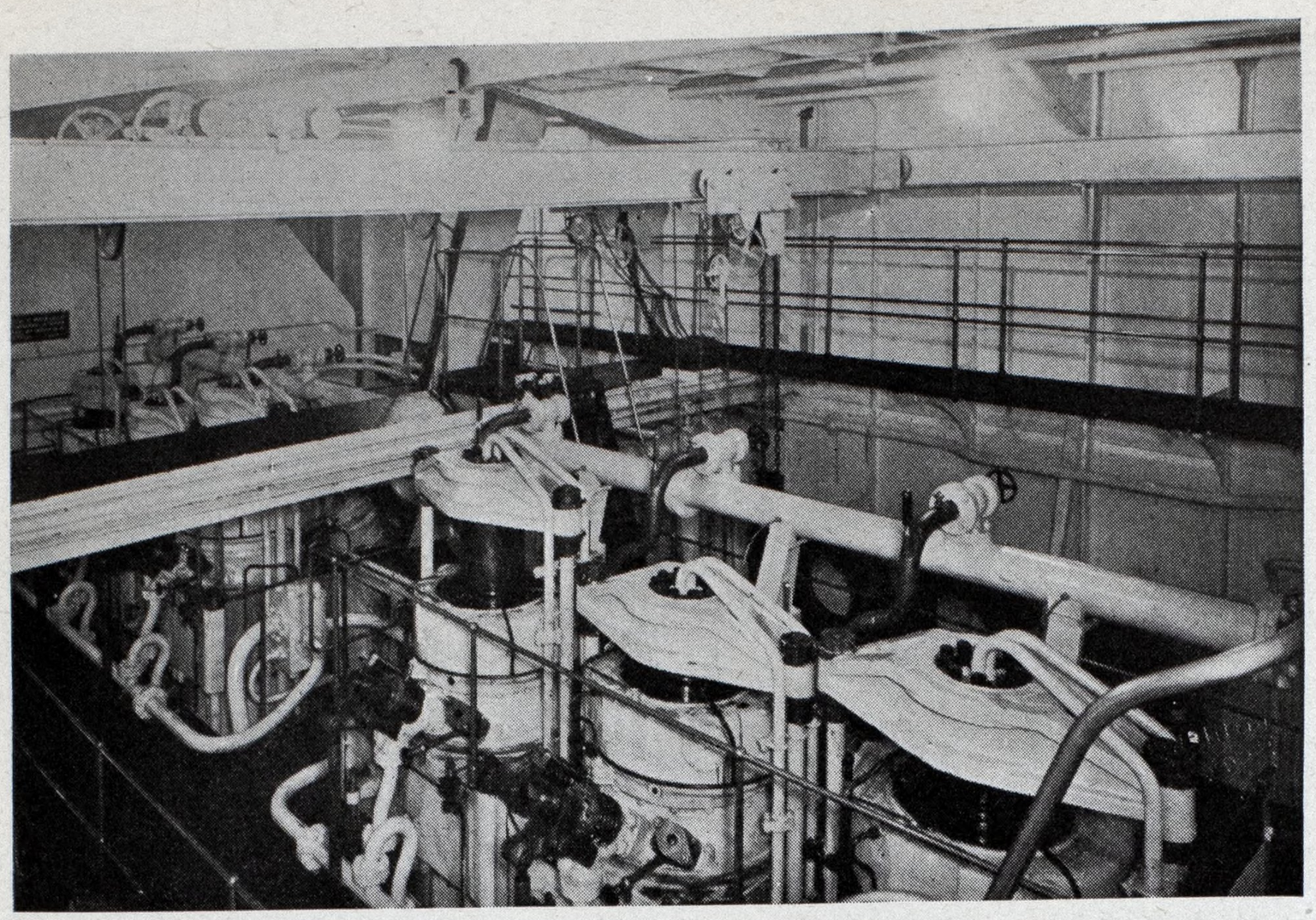
Scavenging and Cylinder Liners

The scavenging ports are common for top and bottom, arranged in a single row right around the circumference of the cylinder liner in the center above the top of the piston in bottom position, and below the bottom of the piston in top position. The cylinder liners are in two parts—a short upper and a longer bottom part, the scavenging ports being arranged in the latter. The top and bottom parts are each provided with a flange for bolting to the cylinder covers.

Cylinder liners are secured by means of four stay bolts for each cylinder, passing from the top cover to the underside of the cross girder of the bed plate. The jointing surface of the cylinder end requires to be tight only for the low pressure at the end of the expansion and to the atmosphere. The jacket for the admission of the scavenging air in the center of the cylinder liner has a loose part, extended downward forming a cylindrical cooling jacket around the bottom cylinder liner. The top cylinder liner is surrounded by a single cylindrical cooling jacket bolted to the underside of the top cover.

The top and bottom cylinder covers are almost alike. The bottom covers are bolted together in groups, the top covers being separate. The internal part of the covers is in the center provided with a cylinder for the exhaust piston valve, having the exhaust ports arranged around the whole of its circumference, and surrounded by water cooled jackets for connection to the exhaust manifolds.

The exhaust piston valve for the top cover is simply a hollow piston fitted



M. S. AMERIKA—TOP OF MAIN ENGINE—NEW TWO-CYCLE DOUBLE-ACTING DIESEL

with self-expanding Perlit piston rings, and arranged for oil cooling internally. The piston valve for the bottom is also of the plain piston type provided in the center with a large hole for the piston rod and fitted internally as well as externally with self-expanding piston rings.

The hollow space is oil cooled in the same way as the top piston valve, the oil being taken from the forced lubrication system and admitted by means of telescopic pipes.

Usual Design of Pistons

The pistons are of a similar design to that of the pistons of Burmeister & Wain's double acting four stroke engines, but longer, like all pistons for the two-stroke types, viz., the length of stroke minus the height of the scavenging port. They are, nevertheless, shorter than for the most of the types of double acting two stroke engines, owing to the adoption of only one row of scavenging ports and the elimination of exhaust ports.

The piston halves of Perlit are bolted around the piston rod flange; the bottom half is extended forming a cylindrical liner surrounding the piston rod for its whole length.

The pistons are oil cooled, and the oil admitted by means of telescopic pipes to the annular space between the piston rod and the liner, being led away through the central hole bored in the piston rod.

The effective scavenging and the fact that the parts most exposed to the hot combustion gases are reduced to about one-half the size of the cylinder is the great advantage of this system. Further, the stroke of the piston valve passing the ports is only about one-third of the piston stroke with a correspondingly smaller speed. The top and bottom exhaust piston valves are rigidly connected by means of crossheads and links. They have no moving parts requiring lubrication outside the crankcase. All the moving parts are inside the crankcase. They consist of balancing levers and connecting rods driven from a smaller crankshaft arranged in the bed plate parallel to the crankshaft and connected to this by means of a chain drive.

The whole mode of procedure in controlling the exhaust resembles that of the ordinary piston valve gear for steam engines, but with one important difference. While the steam piston valve renders a certain resistance, owing to friction, thus reducing the mechanical efficiency of the engine, the exhaust piston valve of this double acting two stroke engine is developing useful work. On account of having a suitable angle of lead for the exhaust piston valve gearing, the mean pressure acting on the valve will be high. The piston valve gear will increase the horsepower of the engine to about 10 per cent above that developed by the main piston.

Airless injection is used on exactly the same principle as fitted for the four-stroke type. Automatic fuel valves are fitted in each cylinder end diametrically opposite to each other. Each cylinder end is thus provided with two spraying nozzles. Each nozzle injects the fuel in a fan-shaped spray extending over a horizontal plane. In order to clear the piston rod and the cylinder wall the directional axis of the sprays is set to form an angle of approximately 45 degrees with the connecting diameter of the two nozzles. The path of the sprays of atomized fuel are slightly curved, carrying the fuel along through the combustion space, on account of a moderate whirling motion of the body of the combustion air due to the tangentially disposed scavenging ports.

Diesel Auxiliaries Are Fitted

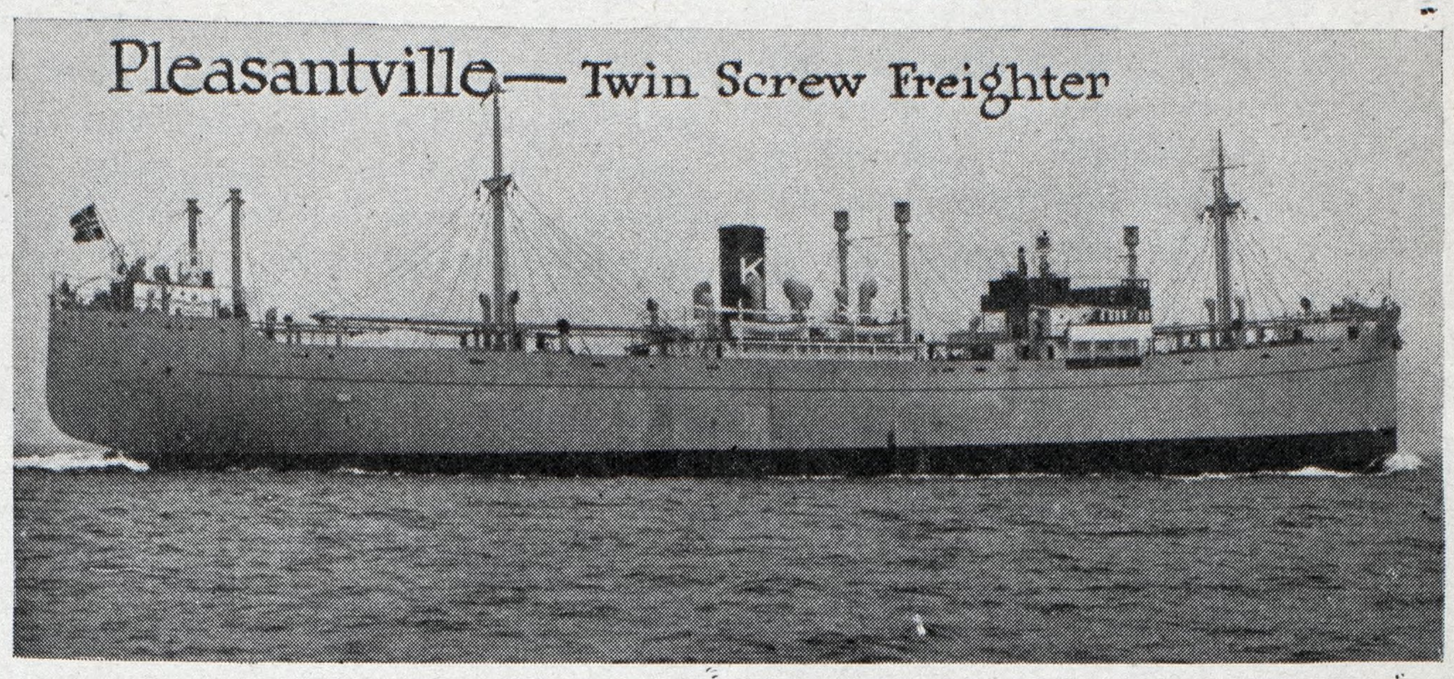
There are three auxiliary six cylinder Burmeister & Wain diesel engines of single acting trunk piston two stroke cycle type with direct driven rotating scavenging pump and airless injection. They are constructed for an output of 600 shaft horsepower each at 300 revolutions per minute, and are direct coupled to 220-volt dynamos, having a capacity of 365 kilowatts. Of these one or two will be needed at sea according to circumstances. Consequently a total of about 1100 kilowatts is available for

(*Continued on Page* 64)

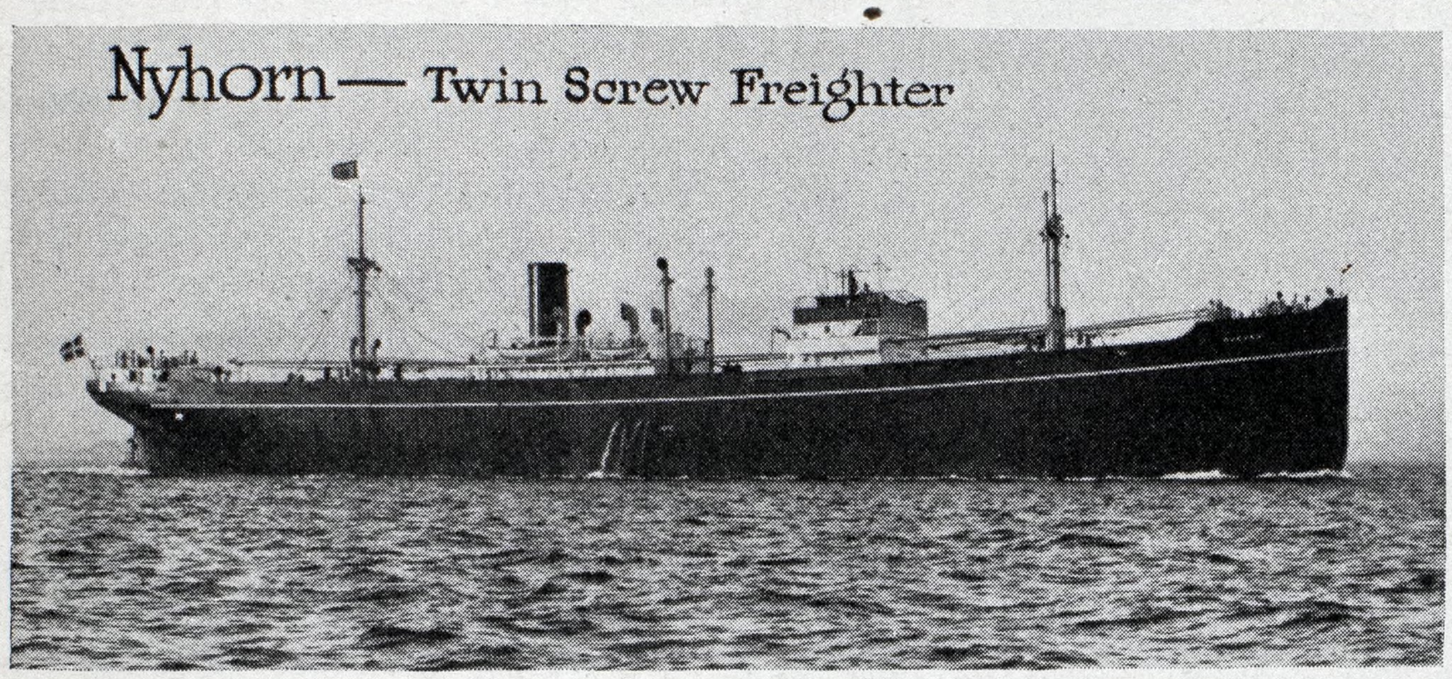
BOAT DECK OF M. S. AMERIKA—HIGH CHOCKED LIFEBOATS

Foreign Diesel Ships of Latest Type

M. S. Pleasantville



Owner	A. F. Klaveness & Co., Ltd.
Builder	Burmeister & Wain, Ltd.
Trial trip	Dec. 6, 1929
Speed on trial, @ 159.1 r.p.m., knots	14.89
Length b.p.p., feet, inches	390-0
Beam, molded, feet, inches	55-0
Depth, molded to shelter d'k., ft., in.	37-0
Height of double bottom, inches	49
Gross tonnage	4548.74
Net tonnage	2748.94
Cargo capacity, grain, cu. ft.	497,100
Cargo capacity, bales, cu. ft.	460,500
Deadweight, tons	8150
Draft, loaded, feet, inches	25-4
Classification, Norwegian Veritas	x.1.A.1.
Number of propellers	2
Main drive diesel engines, 4 cycle, s.a.	2
R.P.M. (nominal) each propeller	155
I.H.P. (nominal) each engine	2500
I.H.P. on trial (both engines)	4883
Auxiliary diesel engines	3
Fuel oil capacity, tons	1411
Deck auxiliaries	Electric driven



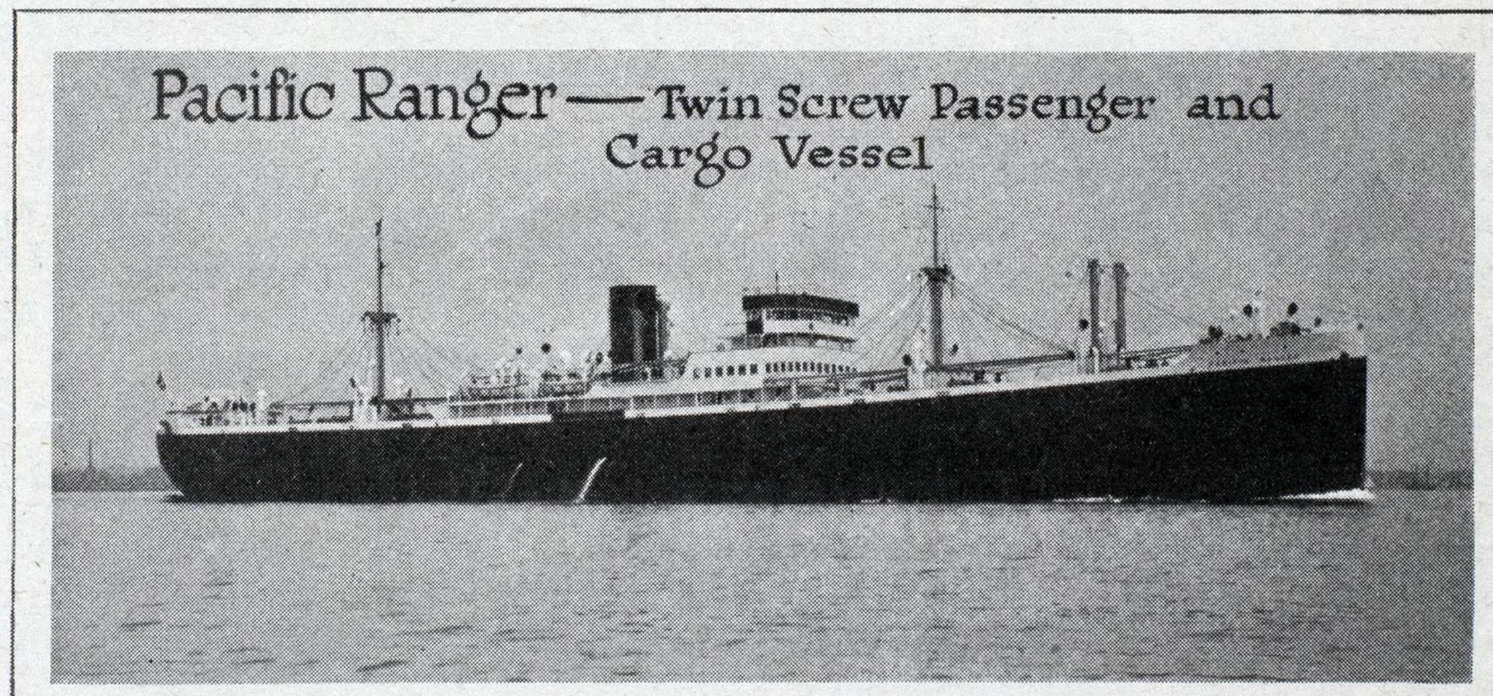
M. S. Nyhorn

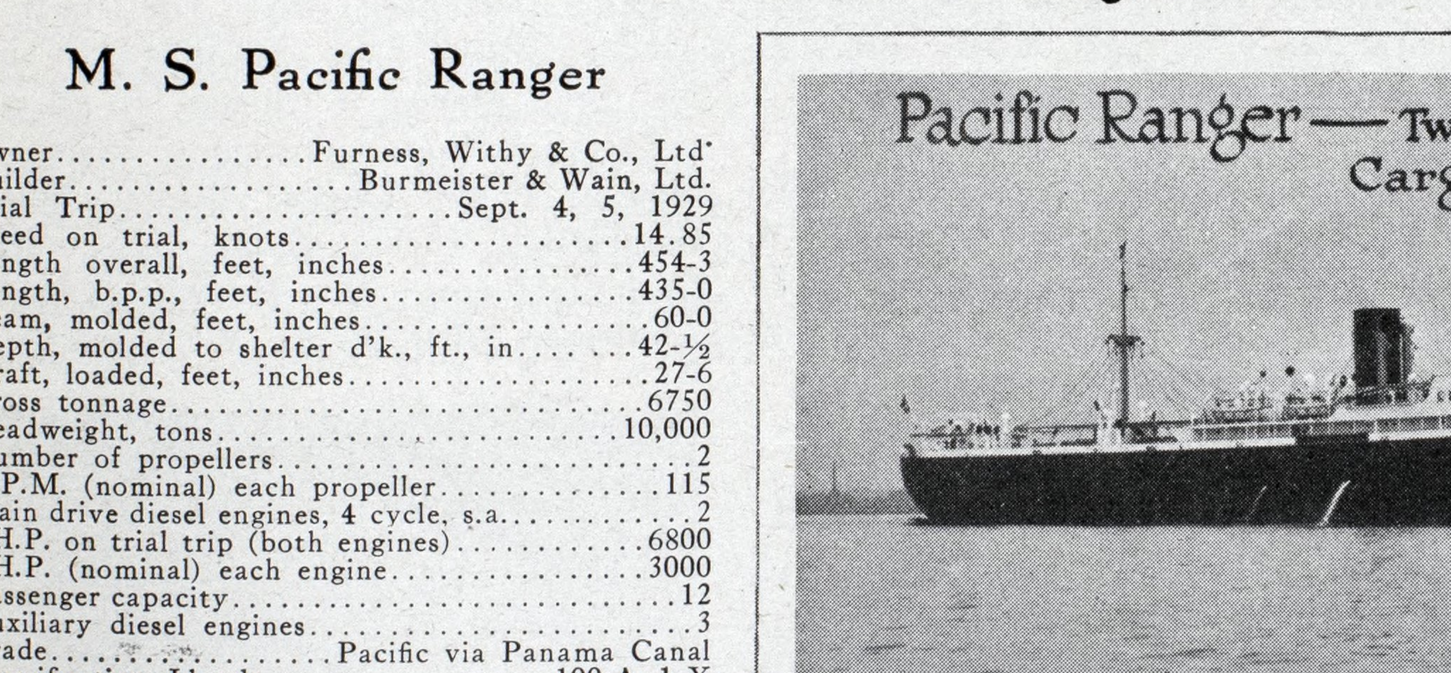
Owner	Christian Haaland
Builder	Burmeister & Wain, Ltd.
Trial trip	Dec. 17, 1929
Speed on trial, @ 156.2 r.p.m., knots	13.55
Length b.p.p., feet, inches	380-0
Beam, molded, feet, inches	53-6
Depth, molded to shelter d'k., ft., in.	36-6
Height of double bottom, inches	48
Gross tonnage	4494
Net tonnage	2732
Cargo capacity, grain, cu. ft.	470,000
Cargo capacity, bales, cu. ft.	436,500
Deadweight, tons	8100
Draft, loaded, feet, inches	25-0
Number of propellers	2
R.P.M. (nominal) each propeller	140
Main drive diesel engines, 4 cycle, s.a.	2
I.H.P. (nominal) each engine	1950
I.H.P. on trial trip (both engines)	3965
Auxiliary deisel engines	3
Trade, Pacific, Orient to West Coast, U. S. A	
Classification, Lloyds	x.100.A.1
Fuel oil capacity, tons	1340
Auxiliaries on deck	Electric driven

M. S. Pacific Ranger

Owner	Furness, Withy & Co., Ltd.
Builder	Burmeister & Wain, Ltd.
Trial Trip	Sept. 4, 5, 1929
Speed on trial, knots	14.85
Length overall, feet, inches	454-3
Length, b.p.p., feet, inches	435-0
Beam, molded, feet, inches	60-0
Depth, molded to shelter d'k., ft., in.	42-½
Draft, loaded, feet, inches	27-6
Gross tonnage	6750
Deadweight, tons	10,000
Number of propellers	2
R.P.M. (nominal) each propeller	115
Main drive diesel engines, 4 cycle, s.a.	2
I.H.P. on trial trip (both engines)	6800
I.H.P. (nominal) each engine	3000
Passenger capacity	12
Auxiliary diesel engines	3
Trade	Pacific via Panama Canal
Classification, Lloyds	100 A. 1 X
Fuel oil capacity, tons	1445

Cold air cargo space is provided



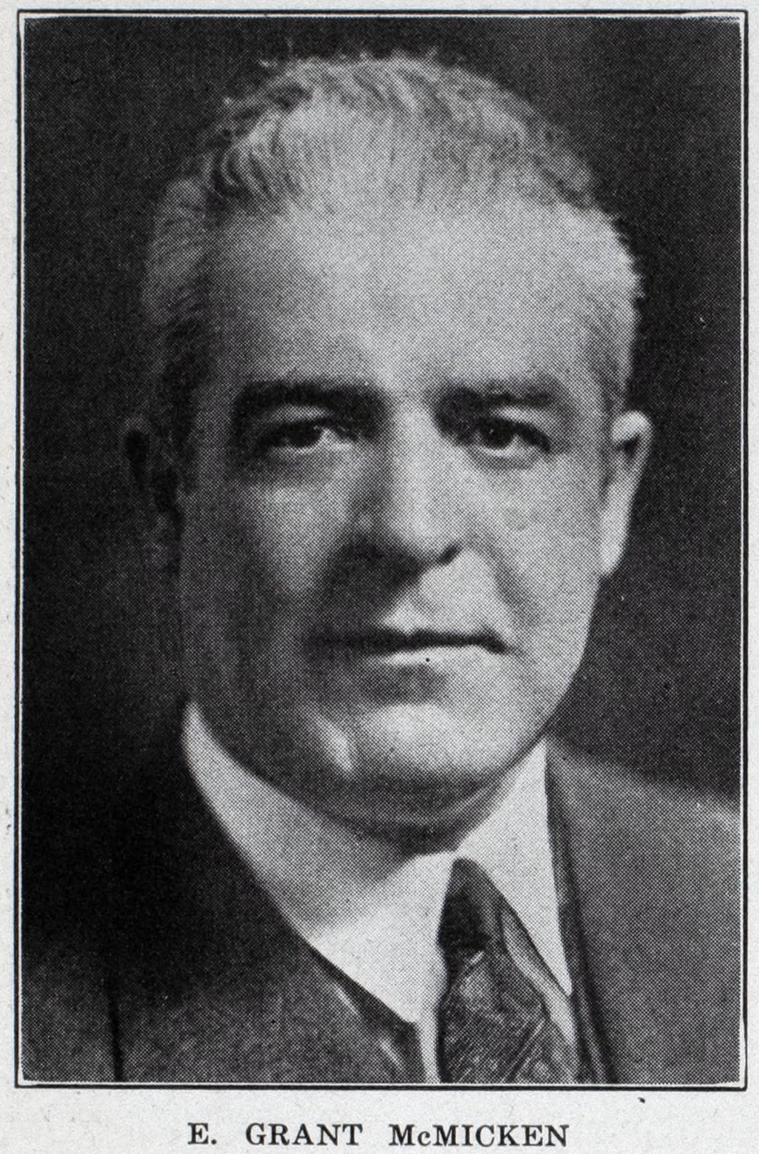


M. S. Hallingdal

Owner	Messrs. Boe & Pedersen
Builder	Burmeister & Wain, Ltd.
Trial trip	Oct. 26, 1929
Speed on trial @ 114.7 r.p.m., knots	12.25
Length b.p.p., feet, inches	325-0
Beam, molded, feet, inches	49-10
Depth, molded, feet, inches	23-0
Draft, loaded, feet, inches	20-5½
Gross tonnage	3180
Net tonnage	1930
Deadweight capacity, tons	5550
Cargo capacity, bales, cu. ft.	281,000
Number of propellers	1
Main drive diesel engine, 4 cycle, s.a.	1
R.P.M. (nominal)	105
I.H.P. (nominal)	1800
I.H.P. on trial trip	2009
Auxiliary diesel engines	3
Sailing radius, miles	32,000
Fuel consumption per day, tons	6
Fuel bunker capacity, tons	760
Deck auxiliaries	Electric driven

Appoint Traffic Manager United States Lines

THE United States lines continues to strengthen its position by adding to its personnel, in responsible positions, experienced transportation men. The latest addition along this line is E. Grant McMicken, as vice president in charge of traffic. Mr. McMicken came to the United States lines from the west coast where he



E. GRANT McMICKEN

had been the successful passenger traffic manager of the Pacific Steamship Co.

Mr. McMicken was born in Minnesota and began his transportation career with the St. Paul, Minneapolis & Manitoba Railway Co. in December 1890. He served with several railroads, finally going to the Seattle offices of the Great Northern Railway Co. In 1899 he became the general freight and passenger agent of the North American Transportation & Trading Co. and in September 1901 he was appointed general passenger agent of the Pacific and Alaska Steamship Co. In 1905 he became general freight and passenger agent of the Northwestern Steamship Co.

In November 1916, when Mr. McMicken was general passenger agent of Pacific Alaska Navigation Co., this company, headed by H. F. Alexander, absorbed the old Pacific Coast Steamship Co., and he became passenger traffic manager of the reorganized company, known as the Pacific Steamship Co., with headquarters in San Francisco. Later he became passenger traffic manager of the company at Seattle where he organized the transpacific service for the Admiral Oriental line with the five 535-footers allocated by the shipping board to the North Pacific.

His attitude is well illustrated by the following statement: "I have always been an enthusiast and an optimist regarding the American merchant marine and naturally have every confidence in its future, particularly on the north Atlantic."

Large Russian Freight Contracts Let

Contracts for the transportation of $350,000,000 worth of freight to Russian ports this year have been made by the American Export and American Scantic lines, doubling the volume of 1929. The contract with the Export line has been in effect since last September and another contract with Moore & McCormack, agents for the American Scantic line was made during the week of Feb. 9, to be effective as long as the Export contract. Early in February two Russian groups arrived in the United States with commissions to spend $8,000,000 and $10,000,000 respectively for power plant and chemical plant materials which will be shipped in American bottoms from Staten Island. At present 1500 men are employed at the Tompkinsville piers in the handling of the freight and shipping men predict they will be kept busy for several years in view of the contracts already made and those pending.

The name of the Heppenstall Forge & Knife Co. has been changed to Heppenstall Co. The general office and works of the company are located at Pittsburgh.

Pensacola Commissioned

The U. S. S. PENSACOLA, first of the 10,000-ton treaty cruisers to be laid down under the terms of the Washington conference was commissioned on Feb. 6 at the New York navy yard. She will leave on a shakedown cruise within six weeks. The PENSACOLA'S keel was laid in May, 1926, and she was launched in April, 1929. She is 550 feet long and 64 feet beam at the waterline, has a speed of 32½ knots and costs approximately $11,000,000 to build.

At the annual meeting of the shareholders of the Wellman-Seaver-Morgan Co., Cleveland, held Feb. 18, 1930, an amendment to the articles of incorporation was adopted, changing the name of the company to the Wellman Engineering Co.

American Scantic Line to Extend Service

The United States shipping board was advised on Feb. 7 of the expansion of the American Scantic line through an arrangement made between the line and the Am-Derutra Transport Corp., which will further expand American shipping. The arrangement provides for regular sailings from New York to the northern ports of the Union of Socialist Soviet Republics. The vessels will go to Leningrad when that port is ice free, and to Murmansk during the remainder of the year. The regular weekly service of the American Scantic line from New York to Scandinavian and Baltic ports will also include Leningrad in its itinerary.

The 10,000-ton light cruiser CHICAGO, seventh of the vessels authorized in the navy's 1924 building program, will be launched at the Mare Island navy yard on April 10. She will be christened by Miss Elizabeth Britten of San Francisco, sister of Representative Britten.

To Handle Yale & Towne Equipment Sales

James C. Morgan, who 10 years ago became affiliated with the Yale & Towne Mfg. Co., Stamford, Conn., has been placed in charge of all material handling equipment sales, including chain blocks, electric hoists, industrial trucks, hand lift trucks, skid platforms, etc. He was formerly connected with the C. W. Hunt Co.

JAMES C. MORGAN

Powerful Fireboat Is Completed

John Kendall—Modern Fire Fighter—Will Protect Detroit's Extensive Waterfront—Large Size—Great Capacity—Ice Crushing Bow

ON DEC. 31, 1929, the fire commission of the City of Detroit accepted delivery of the new fireboat JOHN KENDALL, designed by Dean Herbert C. Sadler, professor of naval architecture at the University of Michigan, and built by the Toledo Shipbuilding Co., Toledo, O. Her station will be at the quarters of Engine Co. No. 16, where she will help to protect a waterfront of 17 miles.

The new boat is 135 feet in length overall, 29 feet beam, 15 feet 6 inches molded depth and 125 feet between perpendiculars. Construction throughout is entirely of steel. The bow has been stiffened for ice crushing and the stern is of cruiser type. A fore and aft compound condensing steam engine of 950 indicated horsepower is used for propulsion. This engine was built by the Toledo Shipbuilding Co. Cylinder diameters are 18 and 36 inches and the stroke is 27 inches. A nine-foot four-bladed propeller direct connected to the engine, at 160 revolutions per minute, gives the boat a speed of 16 miles per hour.

Deck equipment consists of two steam capstans, towing bitts, two 14-foot metallic lifeboats equipped with outboard motors, one 750-pound and one 400-pound stockless anchors. A new feature in fireboat construction is the emphasis laid on smartness in appearance. All railings, turret nozzles, gate handles and other bright work are chromium plated. Fire pumping equipment consists of two 12-inch four-stage Manistee Roturbo centrifugal pumps. Each pump is direct connected to an 800-horsepower General Electric five-stage steam turbine. Guarantees call for the delivery by each pump of 5000 gallons per minute at 200 pounds pump pressure at 1700 revolutions per minute; and 2500 gallons per minute at 300 pounds pump pressure at 1940 revolutions per minute. There are also two 6-inch four-stage, Manistee Roturbo centrifugal pumps, each one able to deliver 500 gallons per minute at 200 pounds pump pressure when running at 2000 revolutions per minute. These pumps are also direct connected to

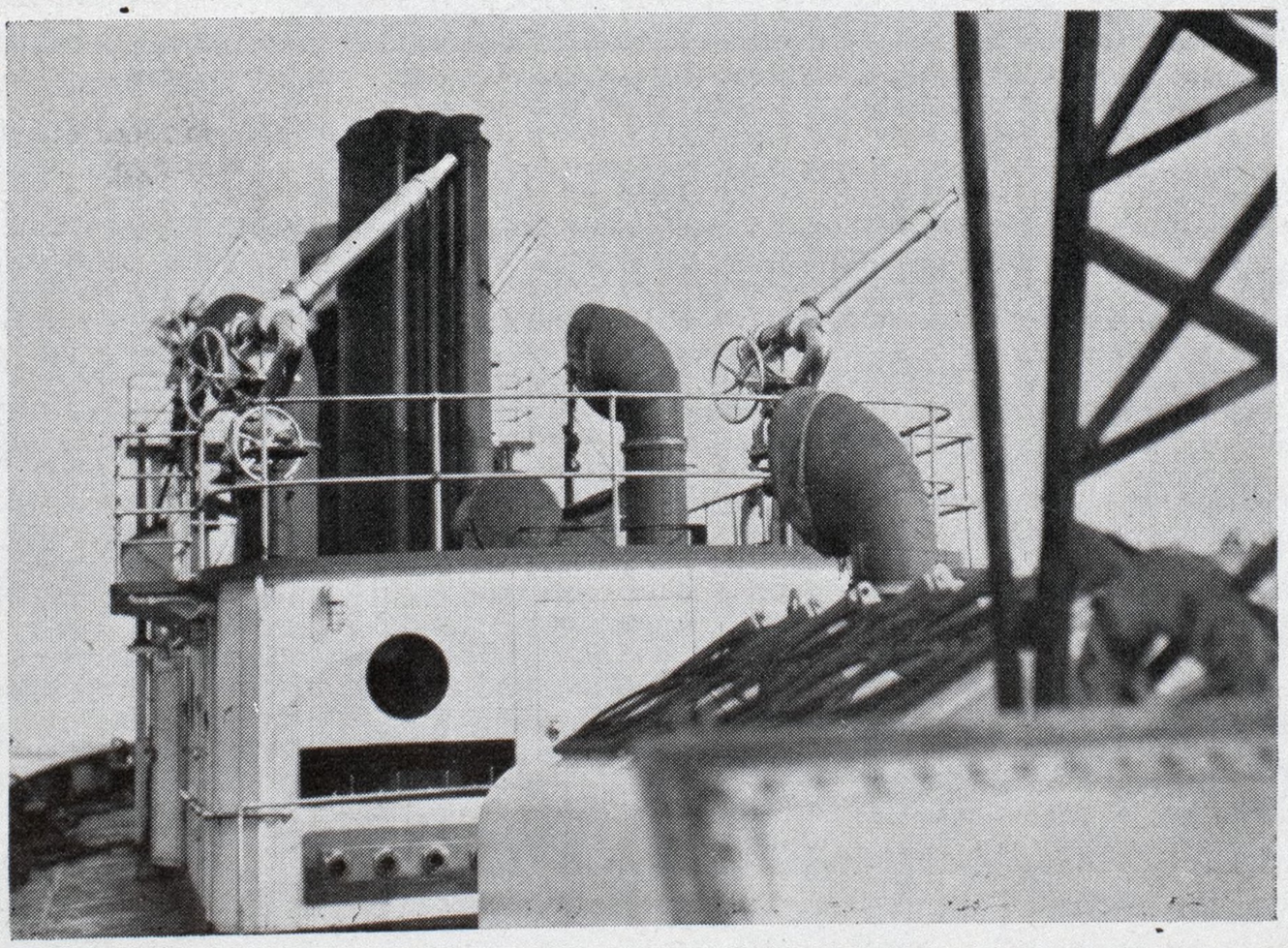
Detroit Fireboat John Kendall

General Electric turbines of the two-stage type.

At the acceptance tests the large pumps exceeded the guarantee by pumping 12,125 gallons per minute at 150 pounds pump pressure, 10,640 per minute at 200 pounds, and 5747 gallons per minute at 300 pounds pump pressure; while the small pumps delivered 1585, 1229 and 816 gallons per minute, respectively, at 150, 200 and 300 pounds pump pressure.

The pumps discharge into a well gated 12-inch loop forward and an 8-inch loop aft, to which are connected by risers the 16 three-inch gate valves on the deck house, eight forward and eight aft, also to the five 6500-gallon 8-inch Morse Invincible turret nozzles, each equipped with 4½, 4, 3½, 3, 2½, 2 and 1½-inch tips located: two on the roof of the pilot house, two on the after end of the deck house, and one on the tower on the after deck 30 feet above the waterline. These are all controlled by horizontal valves located below deck, with stems rising through operating platforms at base of nozzles. Ross valves and flow meters are installed in the main piping.

Steam for operating the pump turbines and all auxiliary units such as bilge pumps, boiler feed pumps, oil transfer, sanitary and circulating pumps, capstans, steering gear and fan is supplied by two Babcock & Wilcox marine watertube boilers, having a total evaporating surface of 6362 square feet and a working pressure of 225 pounds per square inch. The boilers are fitted with oil burners supplied by Babcock & Wilcox Co. and are arranged for forced draft of the closed stokehold type. Air pressure is maintained by a double inlet, high speed, forced draft fan with 24-inch diameter impeller, direct connected to a 30-horsepower at 1900 revolutions per minute steam turbine. The blower was supplied by the American Blower Co. and the turbine by the General Electric Co. All turbines and auxiliaries discharge into a Wheeler condenser and operate on 27 inches of vacuum. While under full operation no smoke or steam discharge from the stacks. A full line of the usual fire-fighting equipment is carried on board, among which may be mentioned such items as 500 feet of 3½-inch, 400 feet of 3-inch, and 2000 feet of 2½-inch, four ply hose, spare nozzles of various kinds, fire steam gages, speed indicator, life line gun and Foamite generator. This vessel, as it is one of the latest, is also one of the most modern fireboats in the United States.



Looking Forward on New Fireboat John Kendall—Nozzles on Top of Pilot House and After End of Deck House. Right Foreground—Portion of Tower Rising 30 Feet Above Water

A New Record Is Made in

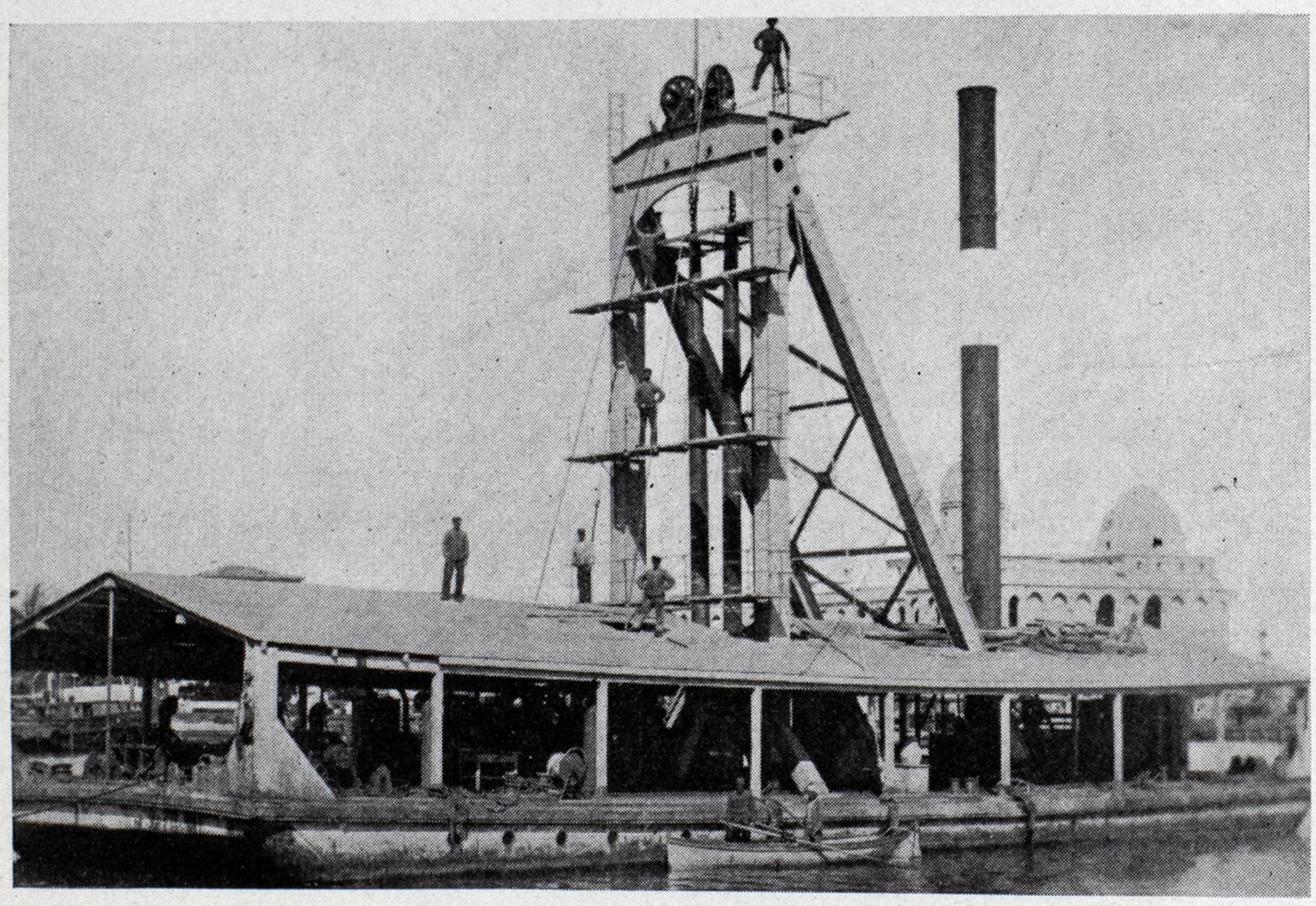
Suez Canal Transits

By Vincent Delport
European Manager, Marine Review

SIXTY years ago, a great French engineer, Ferdinand de Lesseps, attended the opening ceremony of the Suez canal in the presence of Empress Eugenie. This historical event took place on Nov. 17, 1869, when vessels for the first time took the direct route from Europe to the Far East, reducing the distance from London to Singapore by 3500 miles, with a resulting diminution of risk in lives, ships, cargo and money.

Considerable as were the obstacles of a ruthless climate, the greatest difficulties came from the interested resistance of those who controlled the destinies of Egypt at the time when the scheme matured, about 1855. As far back as 1830, de Lesseps, then consul of France in Egypt, had begun to study the possibility of piercing the Isthmus of Suez. In 1852 he submitted a scheme to the Egyptian prince then ruling, but to no avail. Only two years later, however on Nov. 30, 1854, the succeeding prince, Mohammed Said, granted the concession of the canal to de Lesseps. This concession, could only become valid after the sultan of Turkey had given his consent. The strongest opposition was shown in that quarter, and it was twelve years later, on March 19, 1866, that the final consent of the sultan was obtained.

De Lesseps, fully confident in his ability to overcome human and physical difficulties, was not content to passively await the sultan's decision. He put the finishing touches to his plans, obtained financial and moral support, and on Dec. 15, 1858, the Compagnie Universelle du Canal Maritime de Suez was formed, with an initial capital of 200,000,000 francs ($40,000,000). On Aug. 25, 1859, the first shovelful of soil was removed with appropriate ceremony. Slightly more than ten years later, the canal was opened, starting a new era and revolutionizing trade.



PONTOON WITH STEAM HAMMER TO BREAK UP ROCKS

The original plan of the canal provided for a length of 164 kilometers (102 miles). A straight line joining the two seas would be only about 120 kilometers (75 miles), but owing to the configuration of the soil and to other technical reasons, the longer route was found to make for a more economical scheme of construction. At first digging was effected only by native labor using the Egyptian hand-shovel, and earth was taken away in baskets. At certain times 30,000 men were employed. In 1865 machinery was used, and ten years after work had started, the canal was opened to traffic.

At that time the canal, in its completed part, was 8 meters (26.25 feet) deep and 22 meters (72.16 feet) wide. The cost of construction had reached 287,000,000 francs ($57,400,000), and the overhead charges brought this figure to 369,000,000 francs ($73,800,000). The total cost of the canal today, with all the added improvements, is 785,000,000 francs ($157,000,000). During the first years the largest ships that could pass through the canal did not exceed a tonnage of 4500 gross tons. Today vessels of over 27,000 tons, such as the BELGENLAND of the Red Star line, can effect the passage.

The Compagnie Universelle du Canal Maritime de Suez, which controls the canal, is an Egyptian company. The original capital of 200,000,000 francs has not varied, but debentures have been issued at various dates. The board of directors comprises 31 members, of which 20 are French, 10 British and one Dutch. The chairman is French, one vice-chairman is British and two are French. In addition to the board there is a general manager, an assistant general manager and a general secretary. The head office is in Paris.

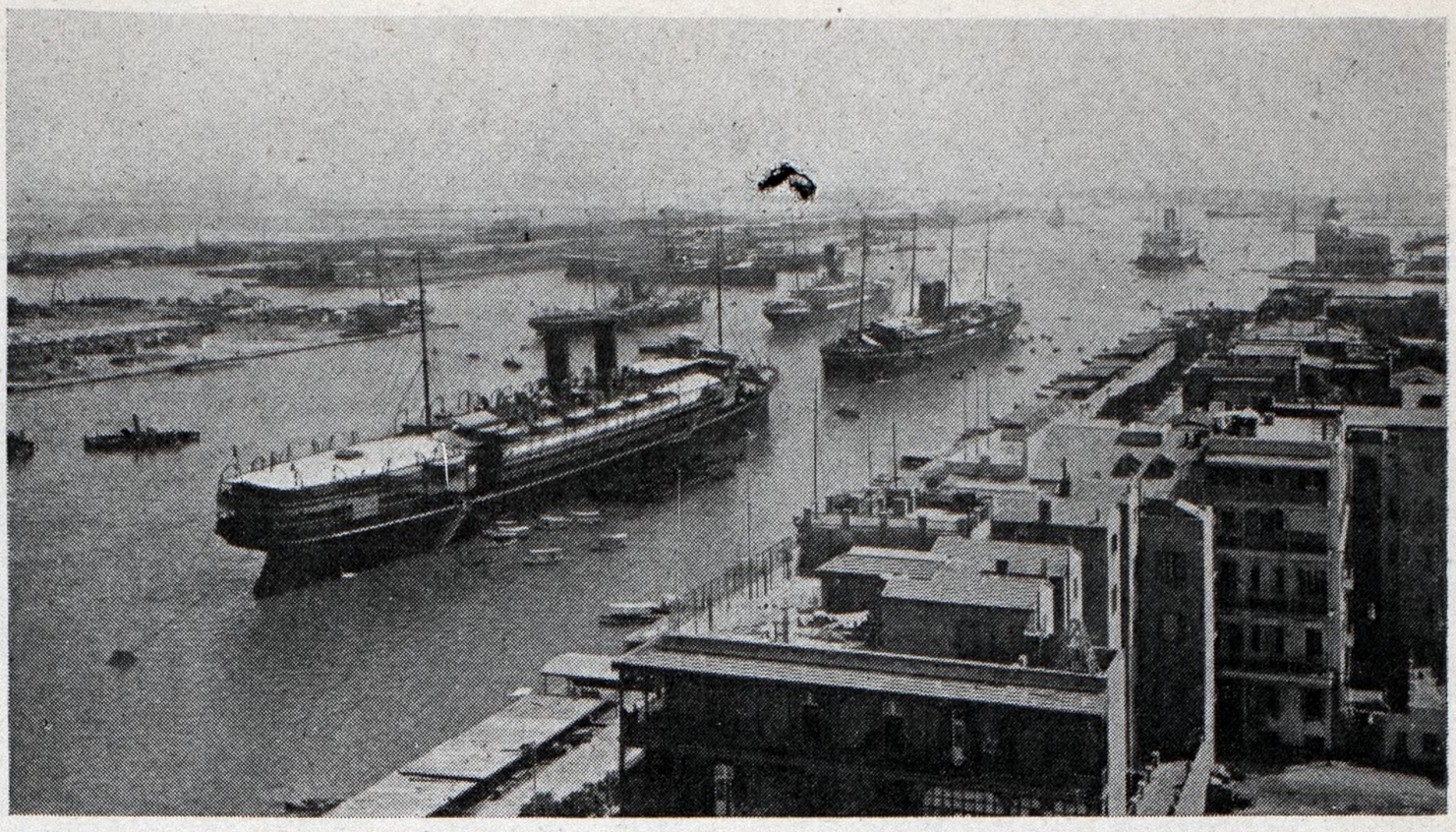
Suez Canal Has No Locks

The Suez canal has no locks. In its present condition its length is 162 kilometers, and 250 meters (101.4 miles) from the Port Said lighthouse to the opening in the Red Sea. There are 140 kilometers or 87.5 miles in straight lines, the balance being in curves of which the minimum radius is 3 kilometers or about 2 miles; consequently these curves in no way impede navigation. The depth of the canal, measured beneath the lowest tide level, is from 12 to 13 meters (39.36 feet to 42.64 feet) for the greater part. For about half-a-mile it is 11.40 meters (37.4 feet), and for a length of about 11.5 miles it ranges from 11.5 to 12 meters (37.72 feet to 39.36 feet).

The width of the canal, measured at a depth of 10 meters (32.8 feet), is 60 meters (196.8 feet) for its whole length, excepting on slightly over 25 kilometers along which the width is 45 meters (147.6 feet). This part will be widened also to 60 meters by the year 1935. At the surface the width of the canal varies with the configuration of the soil; it is at no point less than 105 meters (344.5

feet), and the average is 125 meters (410.1 feet). The maximum draft normally authorized for vessels since Jan. 1, 1925, is 9.75 meters (32 feet). In the period Jan. 1, 1925 to June 30, 1929, only 11 passages of ships having the maximum draft took place. From Jan. 1, 1930, the maximum draft permitted has been raised to 10.06 meters (33 feet).

The general orientation of the canal is north-south, from Port Said in the Mediterranean to Port Thewfik in the Red Sea. At about its middle the canal passes through the shallow lake of Timsah for a distance of about 10 kilometers. Further south comes lake Amer, which in the past communicated with the Red Sea. It then dried up, and only filled up again when the canal was opened. At various distances along the canal, stopping places are provided for. The average duration of a passage is about 15 hours. The largest merchant vessel having effected the passage is the BELGENLAND, which went through once in each of the years from 1925 to 1929. The British cruiser RENOWN, 794 feet long and 102 feet wide, is the longest and largest vessel that has been through up to now. It has effected three passages. It is interesting to note that the floating dock built for the Singapore base passed through the canal in August, 1928. The complete dock was 260 meters (853 feet) long, 52 meters (170.6 feet) wide and 23 meters (75.5 feet) in height. To effect the passage it was divided into two sections, one 141 meters (462.6 feet) long, the other 119 meters (390.4 feet). Each section was towed by four tugs. The passage was effected in four days without causing any considerable disturbance to normal navigation. Table I gives an idea of the economy of time realized by using the canal, starting from London and for various destinations.



HARBOR OF PORT SAID—VIEW TAKEN FROM TOP OF LIGHT HOUSE

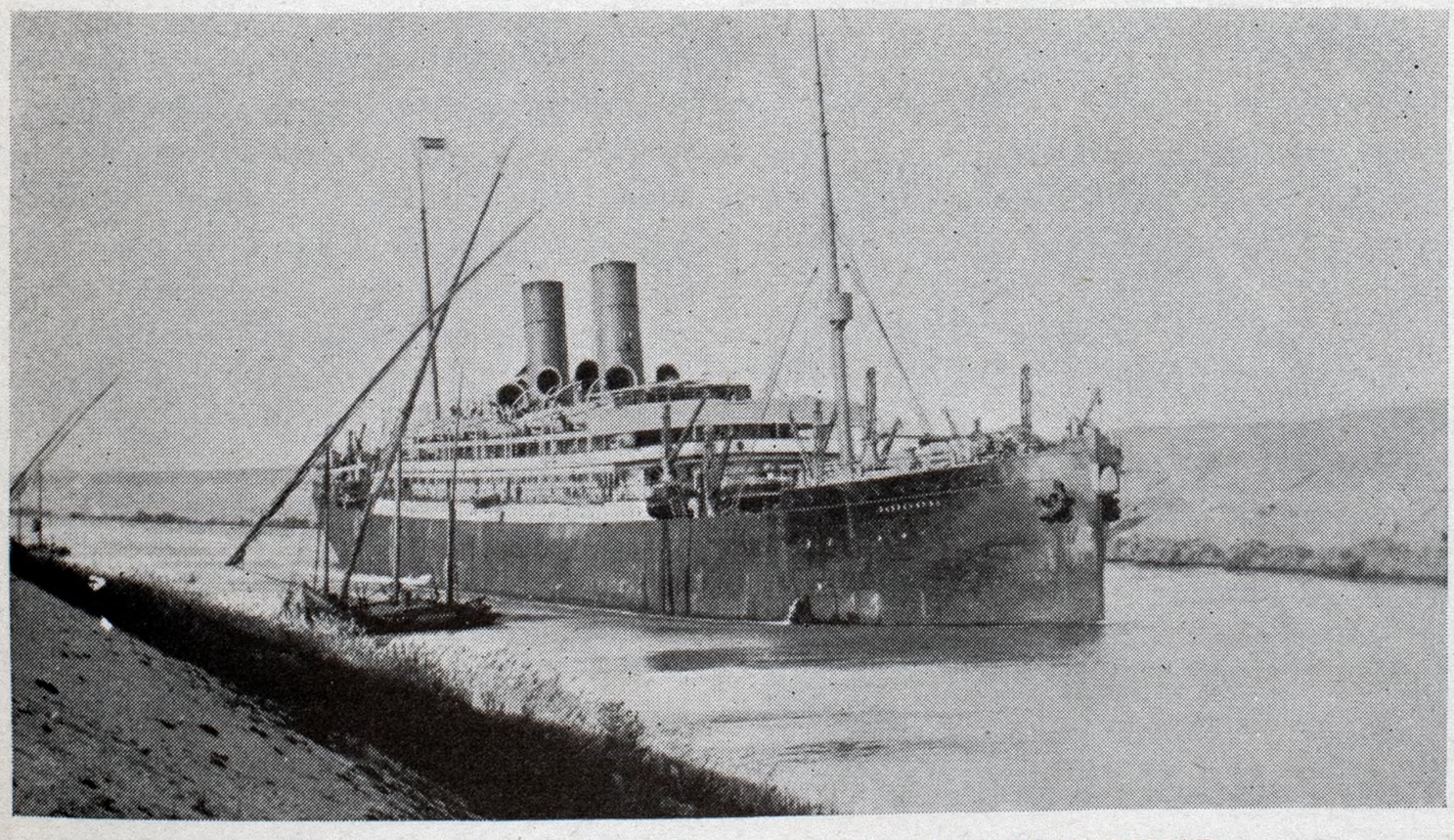
TABLE I

Distances and Duration of Passages from London to Principal Eastern Ports Via Suez Canal and Cape of Good Hope

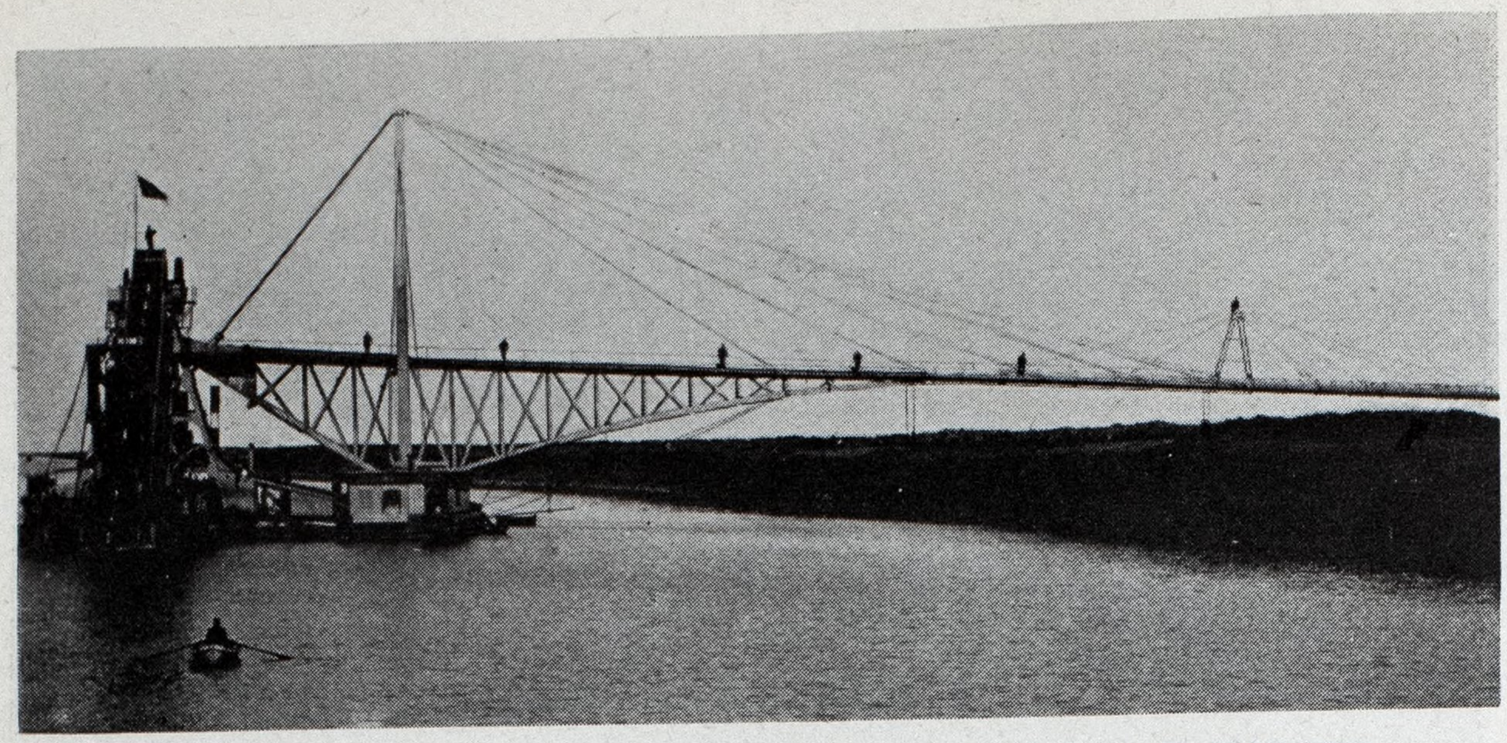
Port of destination	Route	Distance in miles	Duration (in days) Passenger steamers Rapid	Passenger steamers Ordinary	Cargoes Rapid	Cargoes Ordinary
Aden	Cape	10,219	28½	35½	42½	60¾
	Canal	4,675	13	16¼	19½	27¾
Bombay	Cape	10,870	30¼	37¾	45¼	64¾
	Canal	6,307	17½	22	26¼	37½
Calcutta	Cape	11,686	32½	40½	48¾	69½
	Canal	8,019	22¼	27¾	33½	47¾
Singapore	Cape	11,825	32¾	41	49¼	70½
	Canal	8,292	23	28¾	34½	49¼
Batavia (Java)	Cape	11,362	31½	39½	47¼	67¾
	Canal	8,565	23¾	29¾	35¾	51
Hong-Kong	Cape	13,089	36¼	45½	54½	78
	Canal	9,678	27	33½	40¼	57½
Manila	Cape	12,947	36	45	54	77
	Canal	9,681	27	33½	40¼	57½
Melbourne	Cape	11,728	32½	40¾	48¾	69¾
	Canal	11,083	30¾	38½	46¼	66
Yokohama	Cape	14,556	40½	50½	60¾	86¾
	Canal	11,251	31¼	39	47	67

All vessels measuring more than three hundred tons gross must take, either for entering or leaving the harbors of Port Said and Port Thewfik, or for transit through the canal, a pilot of the company, who furnishes all particulars as to the course to be steered. When nearing the buoys at the approach to the Port Said channel, a ship wishing to enter sends up the signal for a pilot. On coming on board the pilot hands to the captain a copy of the company's rules and a pilotage form. The port officials direct the ship to its mooring berth. If, as is usually the case, the vessel only needs coaling or loading stores, it will not be delayed for more than four to six hours. Coaling is effected at Port Said, without any mechanical means, and is very quickly done. As soon as the vessel is ready to proceed, and after having paid its dues, the captain hoists a signal asking for a canal pilot, without whom no ship is allowed to go through the canal. The pilot remains on board until the ship has reached Ismailia on lake Timsah. There the pilot is relieved by another one who directs the ship as far as Suez. On the return journey the canal pilot boards the ship in the Suez roads, and he is relieved at Ismailia, where another pilot comes on board and remains until Port Said is reached.

The average time of passage being about 16 hours, each pilot is on duty for about 8 hours. The maximum speed of ships passing through the canal is fixed at twelve kilometers (6.5 nautical miles) per hour. Exceptionally, ships may be allowed to exceed this limit under the entire responsibility of the captain.



LARGE PASSENGER VESSEL TRANSITING SUEZ CANAL



DREDGE WHICH OPERATES IN THE ROADS OF PORT SAID HARBOR

Ships proceeding in the same direction are not allowed to overtake one another under way in the canal, except in special cases, when the indications of the company's officials must be conformed with. All steamships, tugs included, must stop whenever there is not a clear passage ahead. Ships going in opposite directions must not cross each other; orders are given as to which ship should let the other pass, and the ship that remains stationary must be tied up to the banks.

Night Transits Are Allowed

Navigation of sailing craft of every description by night is entirely forbidden. Other vessels can pass during the night, this procedure having been adopted as far back as 1887. For this purpose steamers must be provided with a search-light showing the channel 1200 meters (1300 yards) ahead, and so constructed as to admit of rapid splitting up of the beam of rays into two separate segments of 5 degrees each, with a dark sector in the middle also of 5 degrees. In addition, steamers must be provided with overhead lights powerful enough to light up a circular area of about 200 meters diameter (650 feet) around the ship. The possibility of night transit has practically doubled the capacity of the canal, which now is more than sufficient to take care of the traffic. In fact, far from being congested, the ordinary appearance of the canal is one of emptiness, since an average of 16 or 17 vessels in 24 hours is spread over a distance of 100 miles.

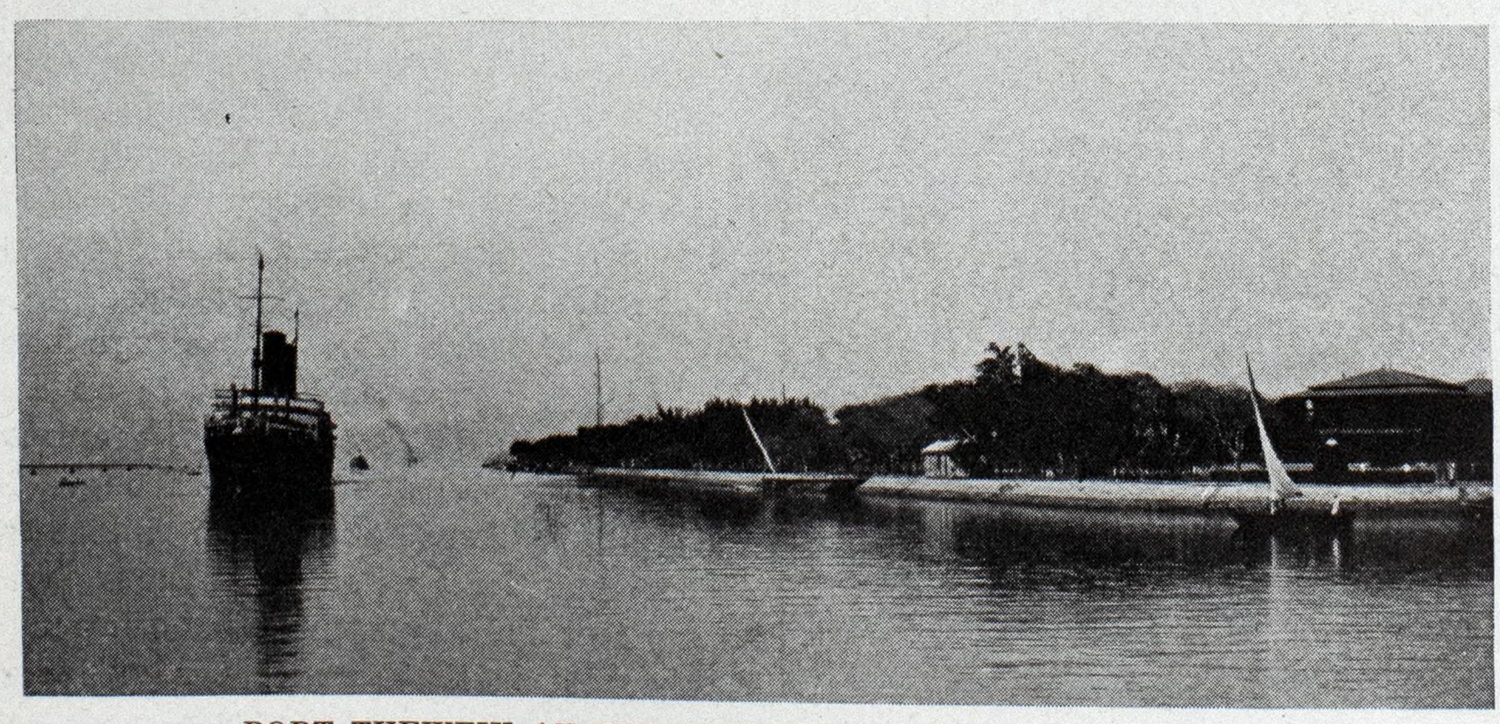
It should be noted that the development of traffic has been due more to increased tonnage than to the actual number of vessels. In the thirty years preceding the war, the tonnage progressed from 6,335,753 net tons to 20,033,884 tons, an increase of over 200 per cent; during the same period the actual number of ships increased by 50 per cent only, from 3307 to 5087. The war brought about a considerable reduction in the tonnage passing, which dropped to 8,368,918 tons in 1917. In 1921 it again rose to 18,118,990 tons, and attained the record figure of 31,905,902 tons, with 6084 vessels in 1928. The figures for

TABLE II

Suez Canal Transit

Year	Number of transits	Net tonnage	Number of passengers
1899	3,607	9,895,630	221,332
1900	3,441	9,738,152	282,511
1905	4,116	13,134,105	252,691
1910	4,533	16,581,898	234,320
1913	5,085	20,033,884	282,235
1917(x)	2,353	8,368,918	142,213
1920	4,009	17,574,657	500,147
1925	5,337	26,761,935	269,522
1926	4,980	26,060,377	286,432
1927	5,545	28,962,048	340,318
1928	6,084	31,905,902	317,718

(x) Year of lowest activity during the war.



PORT THEWFIK AT THE SOUTHERN END OF SUEZ CANAL

gross tonnage would be about 30 per cent higher.

The net tonnage mentioned above is that on which all dues and charges are to be paid by ships. This tonnage is calculated by means of the system of measurement laid down by the international committee held at Constantinople in 1873. First, the gross tonnage or total capacity of ships includes the exact measurement of all spaces (without any exception) below the upper deck, as well as of all permanently covered and closed-in spaces on that deck. Deck loads are not reckoned in the measurement. Closed spaces for the use or possible use of passengers are not to be deducted from the gross tonnage. The determination of deductions for coal spaces may be effected either by the rules of the European Danube commission of 1871 or by the exact measurement of fixed bunkers.

To find from the gross tonnage of vessels as above set forth the official or net register tonnage, either for sailing vessels or for steam ships, the following mode of operation must be resorted to:

How Measurement Rules Work

For sailing vessels deduct: the spaces exclusively and entirely occupied by the crew and the ship's officers, those taken up by the cookhouse and latrines exclusively used by the ship's officers and crew, whether they be situated above or below the upper deck; the covered and closed-in spaces, if there be any situated on the upper deck, and used for working the helm, the capstan, the anchor gear, and for keeping the charts, signals, and other instruments of navigation. Each of the spaces deducted as above may be limited according to the requirements and customs of each country, but the deductions must never exceed in the aggregate 5 per cent of the gross tonnage.

The measurement of these spaces is to be effected according to the rules set forth for the measurement of covered and closed-in spaces on the upper deck; the result, obtained by deducting the total of such allowances from the gross tonnage, represents the net or register tonnage of sailing vessels.

For vessels propelled by steam or any other mechanical power, deduct: (1) the same spaces as for sailing vessels, with the limitation of five per cent of the gross tonnage; (2) the spaces occupied by the engines, boilers, coal-bunkers, shaft-trunks of screw steamers, and the spaces between decks and in the covered and closed-in erections on the upper deck surrounding the funnels, and requiring for the

introduction of air and light into the engine-rooms, and for the proper working of the engines themselves. Such deductions cannot exceed 50 per cent of the gross tonnage.

The measurement of the spaces allowed for both in sailing vessels and in steam ships is to be effected according to the rules set for sailing vessels.

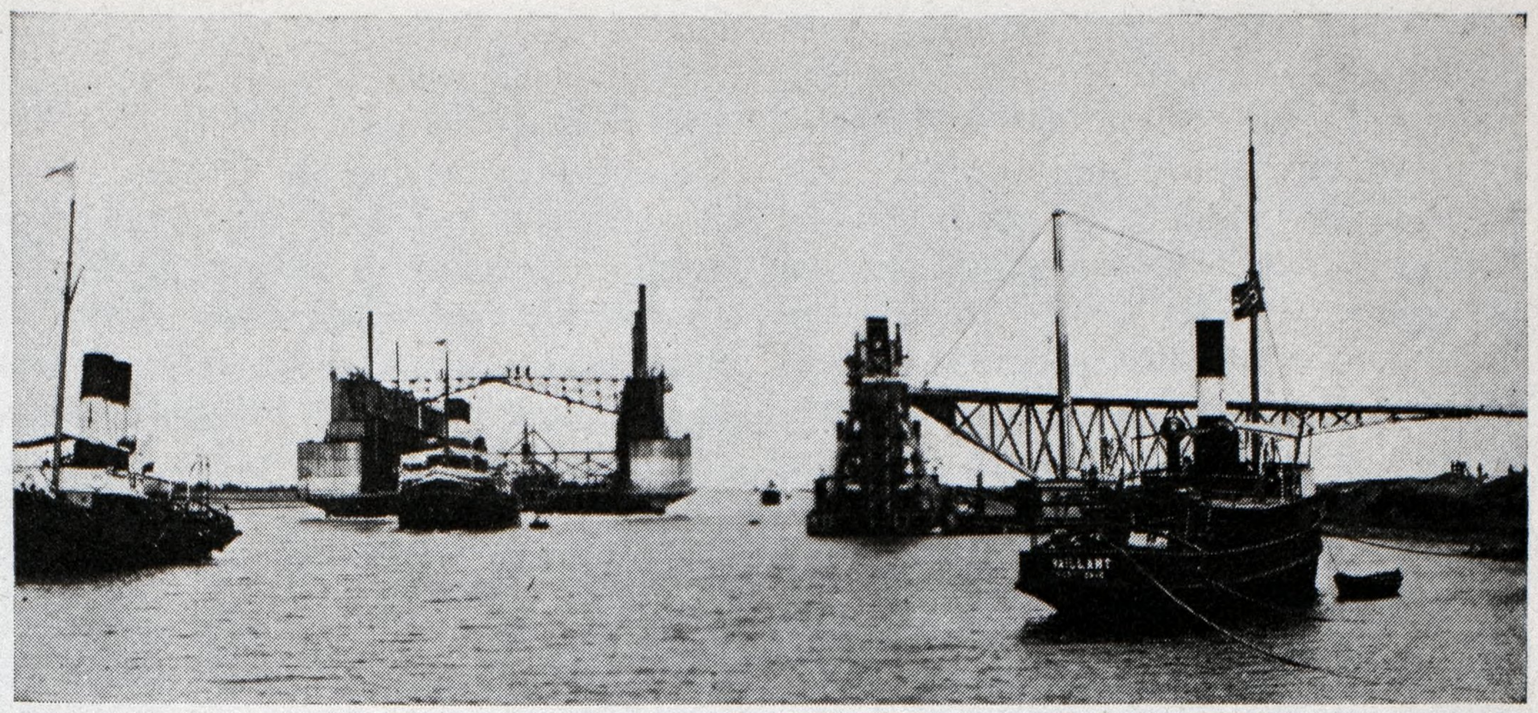
Special provision is made for ships having coal-bunkers with movable partitions and ships with fixed coal-bunkers. Additional deductions are allowed for the chart-room, the cabins of ship's doctors, a mess-room for officers and engineers, and various other spaces. The regulations also cover the measurement of deck spaces and the taxation of double bottoms. All these regulations are set out in full in the rules of navigation of the company, printed in French and English, and a copy of these rules is handed by the pilot to the captain of any vessel entering the roads at Port Said or Port Thewfik. The rules also contain the various tariffs and dues.

Tolls Are Based On Tonnage

The act of concession of Jan. 5, 1856, provided that the maximum toll for transit through the canal should not exceed ten gold francs ($1.94) per ton of capacity on vessels and per head of passengers. The toll is applied to the net ton as defined above. Various modifications were made to the tariff. In 1874 the toll was raised to 13 francs, and then it was gradually reduced until it reached 10 francs again in 1884, and on Jan. 1, 1913, it was further reduced to 6.25 francs, from which point it rose to 8.50 francs during the war. At present the rate of tonnage dues is six francs ninety centimes ($1.34). Ships in ballast are allowed a reduction of two francs fifty centimes ($0.48) per ton on the full rate. In addition to the tonnage dues, transit dues are charged on all passengers at the rate of ten francs ($1.94) per passenger above twelve years of age, and five francs ($0.97) per passenger between three and twelve.

The rate of berthing dues at Port Said, Ismailia, and in the company's docks at Port Thewfik is two centimes ($0.38) per ton per day, whatever be the duration of the ship's stay, but the first 24 hours are not included. These dues are payable every ten days.

Pilotage in the canal itself is free of charge. The payment of dues for pilotage in or out of Port Said and Port Thewfik is charged for as follows: (1) for ships not going through the canal: by day, steamers, 25 francs ($4.82), sailing vessels, 10 francs ($1.94); by night (between sunset and sunrise), steamers, 50 francs ($9.64), sailing vessels, 20 francs ($3.88). (2) for ships going through the canal: by day, free; by night, steamers, 25 francs ($4.82), sailing vessels, 10 francs ($1.94). The payment of these pilotage dues is compulsory on all ships above 300 tons gross measurement. When the pilot is kept on board beyond the time required for pilotage proper, a charge of 40 francs ($7.76) per day is due.



TOWING THE FLOATING DOCK DEWEY THROUGH SUEZ CANAL, APRIL, 1906

TABLE III

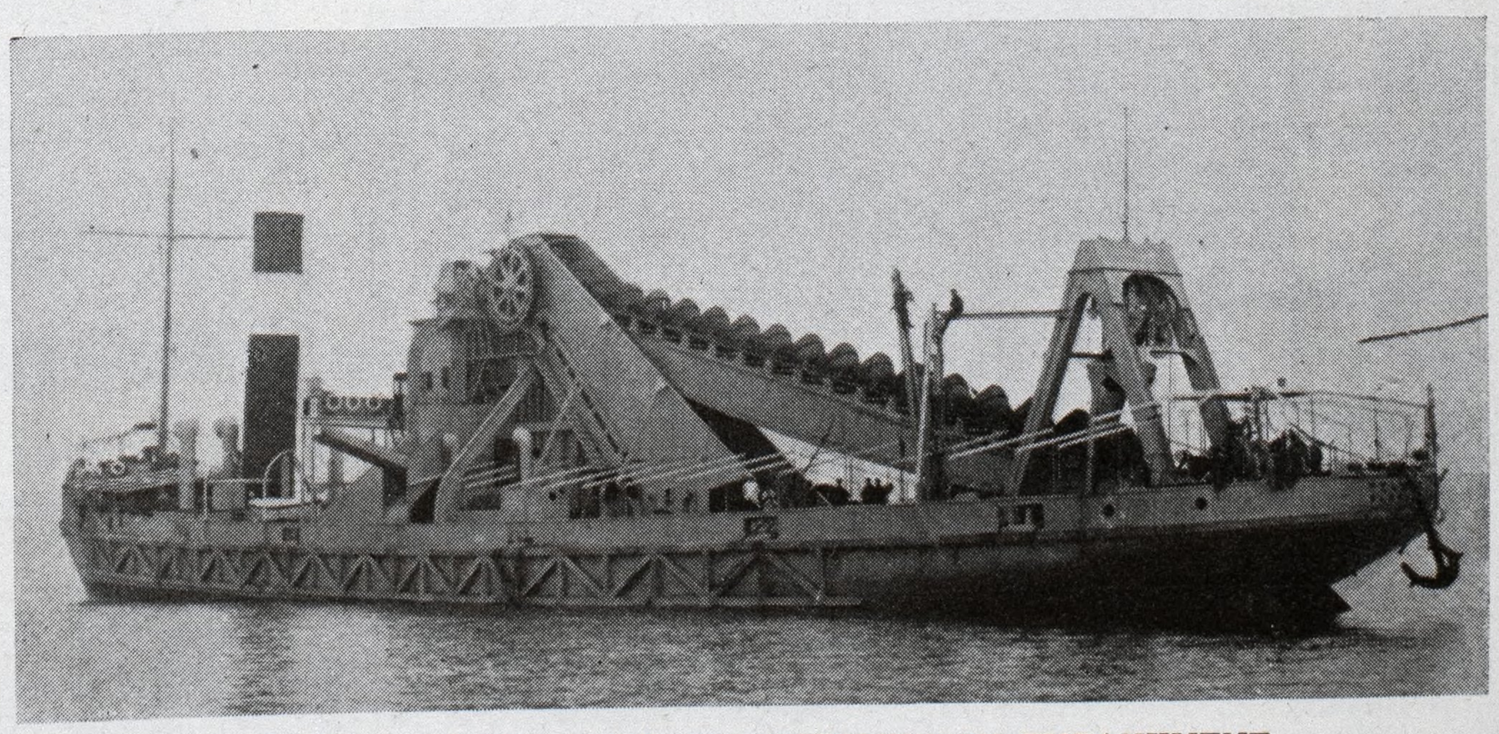
Nationality of Vessels in 1928

Flag	Number of transits	Net tonnage
British	3,393	18,124,074
Dutch	617	3,329,628
German	611	3,300,018
French	359	1,926,969
Italian	363	1,649,792
Japanese	158	940,070
American	123	729,353
Norwegian	149	686,749
Danish	71	353,928
Swedish	66	307,316
Greek	90	280,033
Belgian	40	160,055
Russian	20	67,821
Spanish	6	17,801
Egyptian	8	13,586
Others	10	18,709
TOTAL	**6,084**	**31,905,902**

Tugs may be placed at the disposal of captains to help maneuver their ships on arrival and departure at each end of the canal. Such help is free of charge. The tugs do not supply hawsers. Tugs may be hired for any operation where their assistance may be necessary to tow a ship, or get her afloat, in the harbors or outer-harbors. Towage is compulsory in the canal in the case of sailing ships above 100 gross tons and of any ship not considered by the officials of the company as fulfilling the conditions necessary for safe navigation. Conveying over the whole length of the canal by a company's tug is compulsory for ships carrying in bulk any quantity of petroleum having a flash point below 23 degrees Cent. Ships in tow transit by day only. Towing and conveying charges are fixed according to the company's schedule.

The following information taken from the company's report for 1928 is of interest: The net tonnage passing through the canal in 1928 was 31,905,902 tons, over 10 per cent more than in 1927. The number of transits was 6084, as against 5545. Ballast traffic was 2,956,481 tons, 9.3 per cent of the total traffic. The average tonnage of ships was 7249 tons gross. Eleven per cent of transits was effected by vessels of over 10,000 tons.

In 1928, vessels sailing under the British flag formed 56.8 per cent of



DREDGE WITH LONG ARM FOR DUMPING ON EMBANKMENT

the total traffic, as compared with 57.1 per cent in 1927. Next in importance came Dutch ships, followed by German, French and Italian. The tonnage in weight of goods passed was 32,622,000 tons, over three million tons more than in 1927. During the first months of 1929 progress continued, but at a slower rate than in 1928. During 1928 the amount of dredging reached 5,909,000 cubic meters, as against 5,389,000 cubic meters in 1927 and 5,791,000 cubic meters in 1926.

A considerable amount of social and welfare work has been done by the company during its history. It is of interest to note that the first dwellings caused to be put up by the creation of the canal were built on the western or African shore, owing to the possibility of bringing water from the Nile. Three towns have developed: Port Said, on the Mediterranean, with a present population of over 70,000. The port is one of the most important in the world. Ismailia, on lake Timsah, is the center of exploitation of the company. Port Thewfik, built on excavated soil at the Red Sea end, is the third town. On the eastern shore, opposite Port Said, the company has started the construction of several hundred houses for the staff and working people. A complete city has been planned there on modern lines.

Honor Roll on Shipping Board Vessels

IN JULY 1922, the United States Shipping Board Merchant Fleet Corp., in its endeavor to improve the efficiency of operation of its vessels, established a fuel conservation committee. The members of this committee were selected from various representative organizations concerned with the operation of ships. The chairman of the committee is Capt. C. A. McAllister, president of the American Bureau of Shipping.

The committee proceeded to formulate a program designed: (1) To improve the art of fuel burning; (2) To educate the seagoing personnel in the proper operation of the machinery of the vessels; (3) To standardize, analyze and compare the operation of its vessels; (4) To experiment with, develop and put in use means of improving the engineering efficiency of the vessels.

Recognizing the desirability of rewarding those officers whose performances were outstanding, the Shipping Board authorized the payment of a semiannual bonus of $50 each to the 50 chief engineers and the 50 masters having the best records for the six months' period. This honor roll for the first six months period of 1929 has just been announced by the fuel conservation committee and is given below. To secure a place on this roll a vessel must have turned in an efficiency of at least 95 per cent of that of the leader of her class, and to have traveled at least 20,000 miles during the six months' period. There is also announced an honorable mention list which contains the names of an additional 50 chief engineers and 50 masters, whose performances, although not equaling those on the honor roll, are so meritorious as to deserve mention.

To compile these lists required the analysis of sea and port performances of the voyage of 249 vessels, which have traveled a total of 5,638,840 miles during this six months' period. During this period the vessels were at sea 555,634 hours and in port 410,952 hours.

Denoting the increasing efficiency of operation of Shipping Board vessels it is interesting to know that even allowing for the lower price of fuel oil now prevailing, and the increasing age of the vessels, a saving of $77,570 over the preceding six months' period has been achieved.

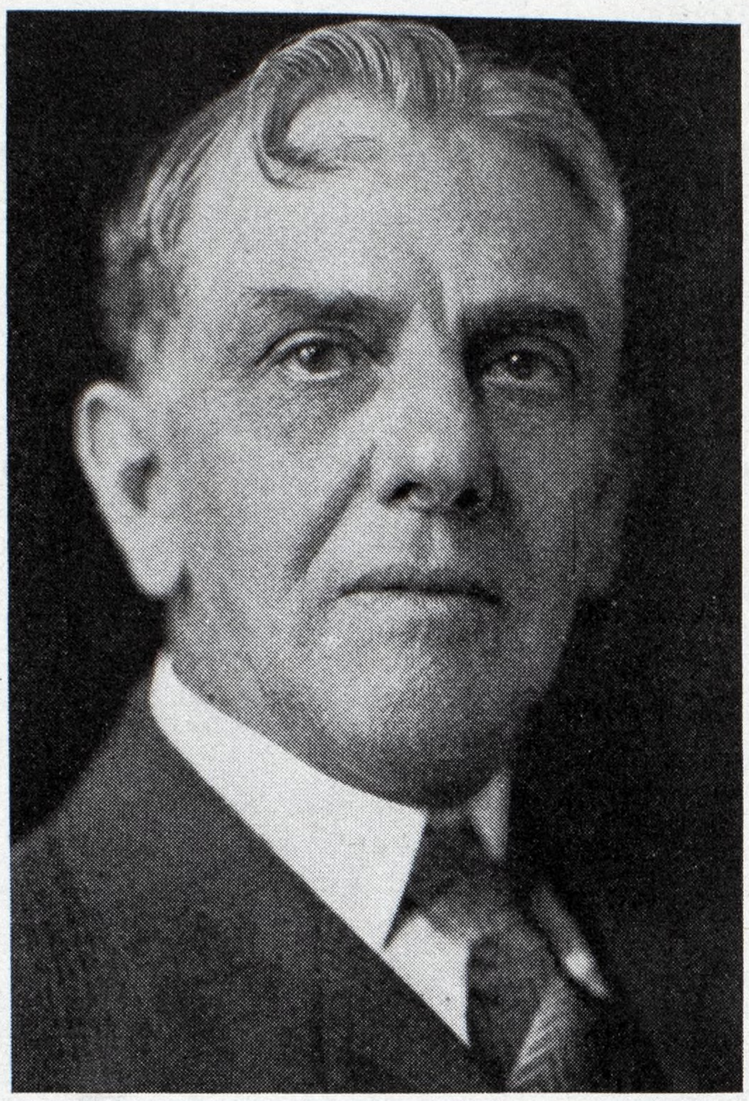
As a matter of interest in illustrating the continued improvement in operation, it is to be noted that in the case of the class "A" vessels built at Hog Island, of which there are now 57 in the Shipping Board service, the reduction in fuel per mile since 1923 has amounted to 28 pounds, which for this class of vessel represents a saving of 110,696 barrels for the first six months of 1929 over what would have been the consumption had there been no improvement over 1923. This is a very substantial saving.

FLEET CORPORATION FUEL CONSERVATION SECTION PERIOD — JANUARY 1ST TO JUNE 30TH 1929

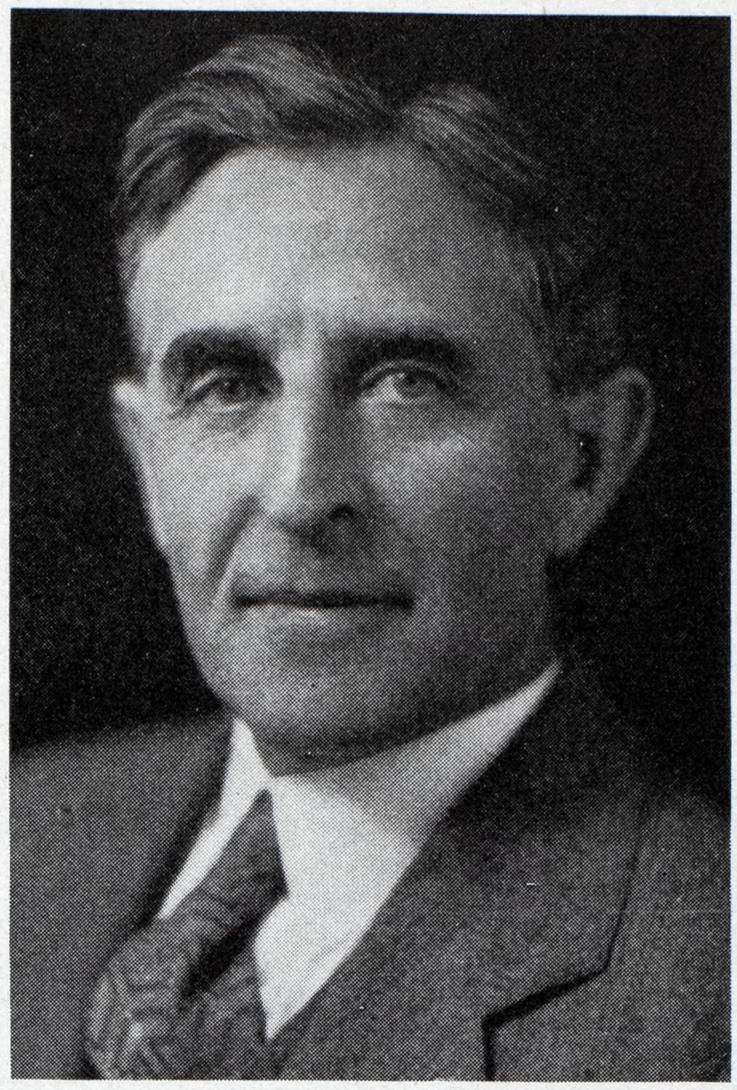
OPERATOR	VESSEL	CHIEF ENGINEER	MASTER	S.C. No.	VESSEL	CHIEF ENGINEER	MASTER	S.C. No.
AMERICA FRANCE LINE — 12 VESSELS	INDEPENDENCE HALL ①	C.G.BARNES ①	D.McKENZIE	5	COLLAMER	W.F.NICHOLS	W.WOLLASTON	5
	WAUKEGAN ②	E.HAMILTON ②	C.SMITH	19				
	McKEESPORT ③	L.J.CATTE ③	A.PETERS	19				
AMERICAN BRAZIL LINE — 4 VESSELS					BANGU	H.MUSGRAVE	C.NORMAN	16
					BIBOCO	H.SHEPPARD	W.LEE	16
AMERICAN DIAMOND LINES — 14 VESSELS	INNOKO ①	G.POORTVLIET ①	R.HODGE	20	AMBRIDGE	H.K.BERRY	J.McCULLOUGH	20
AMERICAN GULF ORIENT LINE — 10 VESSELS	DRYDEN ①	J.C.FLETCHER ①	F.ULSTAD	36				
	ETHAN ALLEN ②	C.WALTERS ②	M.STENESTO	47				
	LIBERATOR ③	H.E.JOHNSON ③		-				
AMERICAN MERCHANT LINES — 10 VESSELS	LEHIGH ①	S.J.MILLER ①	E.HENKE	5	CITY OF FLINT	E.M.KEARNEY	E.E.THOMASSEN	5
	AMERICAN TRADER ②	C.R.ANDERSON ②	H.FISH	73	CHICKASAW	E.E.TOWNSEND	E.W.MYERS	5
					AMERICAN MERCHANT	D.GILL	E.E.MITCHELL	73
AMERICAN PIONEER LINE — 27 VESSELS	ALGIC ①	A.D.PRATT ①	J.ANDERSON	31	EELBECK	H.V.HILQUIST	H.LANGER	22
	EGREMONT ②	I.E.TURPIN ②	J.R.DRIGGS	34	CITY OF DALHART	I.A.HANNA	R.ROSE	78
	ARCHER ③	J.D.BOYD ③	W.SATFELDT	38	SEMINOLE	A.L.FOSTER	H.HUDSON	79
	WEST CUSSETA ④	W.N.HOOKS	D.HOLTH	77				
	CITY OF RAYVILLE	H.L.SCOTT	A.RICCA	78				
	WILSCOX ⑤	C.I.RHOD ⑤	R.E.BUCKLEY	79				
AMERICAN REPUBLICS LINE — 13 VESSELS	WEST KEENE ①	H.P.SAXE	J.McDOUGAL	7-RA	SATARTIA	A.BERGH	W.GEORGE	5
					CONEHATTA	W.M.CARTER	R.LOHSE	5
					BAKERSFIELD	S.S.GAMBLE	J.A.GAINARD	7-RA
					WEST SELENE	W.HAAK	H.C.McNAMARA	14
					OAKSPRING	T.McCOUBRAY	W.E.MORGAN	25
DIXIE MEDITERRANEAN LINE — 6 VESSELS	LABETTE ①	E.GLAZE ①	A.MIDJO	5				
	QUISTCONCK ②	C.B.BROWN ②	G.OLOFSON	5				
	SCANTIC ③	G.CARLSON ③	R.K.VANDERBEECK	5				
	JOLEE ④	E.TILLOTSON ④	H.MULLER	5				
	CHESTER VALLEY ⑤	P.STAUFFER	P.M.ENDOM	5				
DIXIE U.K. LINE — 19 VESSELS	WEST CELERON ①	J.R.COTIE ①	E.P.WHITE	12	AMERICAN PRESS	A.BARICHIVICH	V.KING	5
	POLYBIUS ②	W.J.ROE ②	T.JAMIESON	33	MOUNT EVANS	R.A.CAMPBELL	———	12
					WEST WAUNA	R.L.LEACH	J.WENZEL	12
					DUQUESNE	W.ZIGLER	C.D.TIPTON	19
EXPORT S.S. COMPANY — 9 VESSELS					GATEWAY CITY	W.E.WOODCOCK	H.A.MacPHEE	31

OPERATOR	VESSEL	CHIEF ENGINEER	MASTER	S.C. No.	VESSEL	CHIEF ENGINEER	MASTER	S.C. No.
GULF WEST MEDITERRANEAN LINE — 8 VESSELS	JOMAR ①	C.E.PEPPER ①	D.E.GRIFFIN	5	CARLTON	J.B.WALSH	J.E.FISH	5
	LAFCOMO ②	O.ROGERS	J.M.DUNN	5	OGONTZ	B.VON HEIN	C.CLARK	5
	PRUSA	J.McKERRAL ③	E.BLUHM	5	CARDONIA	H.P.SMITH	J.V.TOULME	5
					WEST CHATALA	S.I.PRITCHETT	I.M.HOLT	12
MISSISSIPPI VALLEY EUROPEAN LINE — 5 VESSELS	CRANFORD ①	P.J.BATTAM ①	A.JAMISON	74	COLD BROOK	W.H.EVANS	W.F.HAGENWALD	5
					CARPLAKA	A.ISAACSON	H.R.SMITH	5
					WINSTON SALEM	C.FLEMMING	S.WALLACE	74
MOBILE OCEANIC LINE — 14 VESSELS	ANTINOUS ①	M.BRIESTEN ①	D.A.STEWART	25	AFOUNDRIA	J.L.JONES	C.REED	5
	HASTINGS ②	R.T.LEMON ②	I.HYSTAD	31	WEST HARDAWAY	J.SHERLOCK	E.M.FRIPP	12
					WEST GOTOMSKA	W.LINDEN	E.L.WHEADON	12
					WEST ZEDA	W.INGRAM	I.MARCUSSEN	12
					WEST HIKA	P.ZIESKE	R.H.SWEETING	14
					BRADDOCK	L.NEINREITHER	L.RESSIJAC	19
ORIOLE LINES — 18 VESSELS	COELLEDA ①	L.HENKEL ①	———	5	BELLFLOWER	C.J.ERICSON	C.E.HILLYER	20
	COLD HARBOR ②	J.C.KRAFT ②	C.W.LORIN	5	HATTERAS	E.M.KNEAVEL	R.E.MOON	48
	CLAIRTON ③	E.C.ORNE ③	J.L.REYNOLDS	20				
SOUTHERN STATES LINE — 30 VESSELS	CODY ①	E.RASMUSSEN ①	H.E.SPEAR	5	TRIPP	G.A.GETCHELL	C.T.McMAINS	12
	SAHALE	F.A.DUENO	M.M.CAMERON	5	WESTMORELAND	W.E.LUND	F.S.PACKARD	19
	WEST QUECHEE	T.J.MOONEY	G.D.SKENE	12	OAKWOOD	J.B.PEEL	H.JOHNSON	25
	YOUNGSTOWN ②	C.R.CROSIER ②	A.JOHNSON	19	EDGEMOOR	I.I.BODDEN	R.HANSEN	33
	OAKMAN	W.A.NANNEY	———	25	MEANTICUT	H.DELCAMP	A.ELLIS	24
	AQUARIUS ③	F.FREDERICKSON ③	H.WARD	25				
	HABAN ④	H.W.WYLDE	H.N.OLSEN	25				
TEXAS MEDITERRANEAN LINE — 8 VESSELS	WEST HARSHAW ①	E.STEFFENS	N.STEFOS	12	WEST MODUS	I.E.WADDY	E.HABY	12
TEXAS STAR LINE — 5 VESSELS					CLIFFWOOD	I.BURKS	I.V.SMITH	5
					ENDICOTT	R.HENDRICKSON	G.W.HATCH	22
TEXAS UKAY LINE — 12 VESSELS	WEST EKONK ①	———	H.SIMMONS	12	EDGEHILL	F.J.O'NEIL	G.ECONOMOU	33
	CRIPPLE CREEK ②	C.FREDERICKSON ②	J.P.FORREST	22	STEADFAST	W.P.FLORES	M.J.DIERLAM	50
	ELMSPORT	J.E.TSAVARIS	E.M.DIERLAM	33				
	COLORADO SPRINGS ③	I.E.ROMAN ③	J.P.ORWIN	33				
UNITED STATES LINES — 6 VESSELS	LEVIATHAN ①	J.J.FAGAN ①	H.CUNNINGHAM	49	PRES. ROOSEVELT	J.J.GANLY	T.VanBEEK	3
	GEO. WASHINGTON ②	W.GRACE ②	A.B.RANDALL	62				
	AMERICA ③	P.BRENNAN ③	G.FREID	63				
	REPUBLIC ④	A.W.STYRON ④	A.M.MOORE	75				
YANKEE LINE — 8 VESSELS	WEST POOL ①	R.F.PHINNEY ①	L.W.THOMPSON	6	JEANNETTE SKINNER	H.MOLVAR	E.S.McKOWN	12
	LORAIN ②	E.L.INNESS ②	J.M.CAULK	19				

MEN of MARINE AFFAIRS



CAPT. J. J. FREITUS
Manager, Becker Steamship Co.



M. H. WARDWELL
Secretary, Great Lakes Towing Co.

J. D. REILLY
Treasurer, Todd Shipyards Corp.

E. J. McCORMACK
Treasurer, Moore & McCormack

Photos by Blank-Stoller, Inc.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

WHERE the law of both countries to which colliding ships belong, as well as of most other maritime nations, allows recovery for wrongful death on the high seas, there is no good reason for not recognizing it as the general maritime law applying to an accident under act of March 30, 1920.—PRESIDENTE WILSON, 30 F. (2d) 466.

* * *

IT WAS urged in the case of ELKRIDGE, 30 F. (2d) 618, involving a salvage award, that the United States was under statutory liability to pay compensation to the dependents of two men who were drowned, and that the court should take judicial notice of the existence of such liabiity. In ruling against this contention, the court said: "Loss of life may have a bearing on the element of risk involved in the salvage service; but the fact that the government must pay for the loss of life does not increase the value of such service to the salved vessel, nor the amount she should be required to pay her salvors." An award of $25,000 was permitted to stand.

* * *

WASTE fuel oil is "refuse" within the meaning of act of June 29, 1888, section 1, prohibiting the discharge of refuse in the tidal waters of the harbor of New York.—ALBANIA, 30 F. (2d) 727.

* * *

IN ALLOWING dead freight to a vessel for deficiency of goods shipped under the quantity required by charter, the award, said the court in Steamship Co. of 1912 v. C. H. Pearson & Son Hardwood Co., 30 F. (2d) 770, should have been based on a net rate, instead of a gross rate, because the owner of the vessel, in order to earn its gross freight, would have had to pay for loading and discharging, and other expenses. The correct measure of damages for dead freight is the gross freight on the cargo shipped, less any expenses saved because of not carrying it.

* * *

AS USED in contracts of affreightment, "perils of the sea" denotes all marine casualties resulting from the violent action of the elements, as distinguished from their natural, silent influence, upon the fabric of the vessel; casualties which may, and not casualties which must, occur. Damage to a cargo by sea water is caused by a peril of the sea when it is shown that the cause of the entrance of the water was not the unseaworthiness of the ship, the negligence of the captain or crew, or the ordinary wear and tear on the ship to be expected in the usual course of navigation, but unusual stress of weather, or the violent action of the elements as distinguished from their natural, silent influence upon the fabric of the vessel.—Davison Chemical Co. v. Eastern Transportation Co., 30 F. (2d) 862.

* * *

A SHIP will not be held to be unseaworthy because a method is not provided for drawing hot water in the galley or anywhere outside of the engine room, as it is not required that a ship shall have the best appliances.—UBBERGEN, 30 F. (2d) 951.

* * *

INSURANCE on a cargo of cotton did not run out because the vessel did not discharge such cotton upon her first call at the port of destination, being unable to do so because of the congested condition of the port, as this was not the beginning of a new voyage beyond the point of destination, but a mere unimportant change or continuation of the original voyage permitted, it is assumed, by the insurance contract, and not unusual along the coast of Central America.—Ocean Marine Insurance Co. v. Lindo, 30 F. (2d) 782.

* * *

IN THE absence of statute, under the maritime law, the master of a vessel is not entitled to a lien on either the ship or the freight for his wages.—Alabama Dry Dock & Shipbuilding Co. v. Foster, 31 F. (2d) 394.

* * *

WHERE a vessel was operating under a time charter, which contemplated a number of voyages, the warranty of seaworthiness must be construed as requiring that the vessel be seaworthy at the inception of each and every voyage. As the vessel in issue in the case of Federal Forwarding Co. v. Lanasa, 32, F. (2d) 154. was engaged in the transportation of highly perishable freight, being seaworthy meant that there was nothing in her condition or equipment which would cause delay, once the perishable cargo was loaded; for the test of seaworthiness is the fitness of the vessel to carry the cargo which she has undertaken to transport.

* * *

IN THE collision case of Steffens v. United States, 32 F. (2d) 206, the court said: "We are concerned only with the faults of the AALSUM, which are charged to be, first, an 'immoderate' speed and, second, failing to stop her engines upon hearing the DANNEDAIKE'S signals—both violation of article 16 as it has stood since 1889. The first depends upon whether she could stop her way with such visibility as existed after sighting another vessel. That duty is, however, correlative with the duty of the other vessel to do the same. The rule is not theoretically adequate in all cases; though each vessel be in such reserve that she can check her way before she reaches the place at which the other appears, it does not follow that they cannot collide. The point of meeting may be such that they will both reach it, though each could have stopped before reaching the place where she could first have sighted the other. However, it is the only practicable rule, and it is the law.

* * *

A TANK made water-tight by the use of white lead is not seaworthy for the carriage of linseed oil, declared the court in the case of American Linseed Co. v. Norfolk & North American Steam Shipping Co., Ltd., 32 F. (2d) 281, and the use of white lead in a tank for such oil is not the use of due diligence in making a vessel seaworthy. Negligence in using white lead in the preparation of the tank for the carriage of oil, and the stowage of oil in a tank made water-tight by the use of white lead, constituted negligence and lack of care in making the ship seaworthy for the purpose of carrying oil and negligence in stowage. That the carrier employed an engineering company to repair the tanks, and that a surveyor, acting for the shippers, approved the condition of the tank did not affect the owner's duty to exercise due diligence to make the ship seaworthy and in stowing the oil.

* * *

MOST perfect equipment or appliances are not required of a master, but customary employment and good order is the test. By the failure of a fisherman to use the safety appliances provided, known to him, and the violation of specific orders with relation to the employment of both hands in disentangling the hook, and not moving the lever conveniently placed and stopping the winch, when entangling hooks were apparent, pursuing unsafe methods in performance of duty, he assumes the hazards known or open, obvious, and apparent and necessarily attendant upon the undertaking. When a master provides safeguards against danger and specifically instructs with relation to the performance, and injury results because of omission to employ the safety appliances, or follow specific instructions for operation in usual manner, recovery for injury may not be had.—ALOHA, 32 F. (2d) 284.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	542	2,506,444	572	2,658,125
December	517	2,331,342	518	2,257,424
November	520	2,236,677	537	2,387,932
October	564	2,591,207	561	2,561,403
September	577	2,642,897	567	2,548,764
August	584	2,537,306	626	2,775,730
July	580	2,648,419	588	2,582,929
June	575	2,511,671	582	2,582,929
May	605	2,612,925	640	2,782,012
April, 1929	626	2,677,963	606	2,547,409

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	94	281,558	66	202,453
December	87	237,510	49	143,761
November	80	222,026	48	133,872
October	99	262,305	62	154,401
September	107	282,105	61	145,895
August	110	271,857	54	120,595
July	120	321,726	70	188,269
June	97	254,811	61	140,065
May	126	343,548	75	191,192
April, 1929	118	318,240	76	194,158

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	93	306,097	42	128,581
December	95	286,749	62	208,978
November	101	332,269	67	221,318
October	95	310,386	56	196,590
September	139	387,061	106	265,839
August	139	387,061	106	265,839
July	151	376,620	109	327,487
June	135	309,662	103	268,270
May	139	343,990	113	286,147
April, 1929	125	328,493	87	221,533

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	22	47,329	23	51,644
November	26	51,231	26	50,475
October	25	54,402	25	56,022
September	30	58,497	30	64,559
August	32	59,299	31	58,111
July	31	55,932	31	53,761
June	29	49,060	28	47,961
May	24	39,080	25	39,830
April	20	45,922	21	48,999
March, 1929	15	36,185	15	38,415

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	13	48,880	5	24,055
December	10	35,615	4	16,406
November	10	38,203	6	22,371
October	6	20,741	8	32,974
September	9	38,226	5	23,339
August	6	24,438	6	25,315
July	12	38,408	9	29,585
June	11	40,920	7	31,040
May	11	39,061	5	18,506
April, 1929	5	20,267	5	17,898

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	31	122,031	44	165,208
December	39	146,486	53	118,117
November	34	129,809	65	234,575
October	39	148,172	59	221,007
September	33	129,576	52	191,302
August	45	166,207	65	229,834
July	42	151,702	54	198,109
June	30	109,084	47	170,643
May	26	98,630	48	172,196
April, 1929	36	136,793	47	169,257

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	131	422,932	135	435,506
December	134	415,201	134	425,362
November	132	438,274	137	446,120
October	138	450,603	146	463,723
September	117	374,893	108	355,532
August	141	444,315	150	466,464
July	160	499,292	158	485,913
June	135	430,355	134	427,138
May	155	478,043	155	465,843
April, 1929	158	471,851	156	465,710

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	13	27,927	75	208,959
December	30	75,636	58	164,287
November	39	50,600	79	204,216
October	32	87,466	79	209,997
September	27	67,040	74	189,010
August	32	86,983	95	256,104
July	32	74,562	97	220,215
June	23	39,983	78	160,520
May	29	80,599	89	228,221
April, 1929	20	54,399	73	215,664

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	12	24,225	16	31,722
December	19	36,831	12	20,409
November	10	22,938	10	18,750
October	12	20,268	8	19,134
September	17	36,618	13	23,731
August	18	45,422	10	15,617
July	12	21,338	12	22,111
June	14	21,699	16	35,889
May	12	24,974	12	26,010
April, 1929	15	33,734	13	27,662

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	74	86,081	71	85,990
December	68	78,984	65	78,634
November	84	97,555	83	97,217
October	74	88,850	75	88,853
September	55	64,464	59	72,321
August	60	70,851	60	68,913
July	72	84,674	67	80,233
June	68	81,920	68	78,980
May	99	110.911	100	110,658
April, 1929	79	77,934	75	77,672

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	118	281,672	108	256,384
December	110	262,685	101	238,149
November	107	231,376	111	259,712
October	123	304,950	119	294,276
September	91	208,323	83	213,660
August	96	233,785	83	193,379
July	110	267,053	109	264,552
June	97	204,219	98	218,437
May	89	211,519	75	168,343
April, 1929	102	213,941	77	174,116

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	51	229,516	55	246,266
December	57	292,419	62	302,713
November	68	278,207	73	306,493
October	72	293,569	68	277,041
September	46	203,192	47	203,236
August	62	258,910	63	263,569
July	64	259,303	62	252,021
June	48	199,237	56	233,867
May	51	216,463	53	221,564
April, 1929	62	264,744	61	254,647

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1929	244	681,983	261	713,490
September	257	684,203	260	698,665
August	272	726,363	273	721,024
July	279	712,324	288	741,716
June	277	708,089	273	711,898
May	289	758,671	277	717,581
April	294	751,444	278	708,155
March	283	773,515	298	517,632
February	248	682,052	249	675,432
January, 1929	273	710,969	282	744,078

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
April, 1929	24	62,976	26	62,467
March	14	37,470	18	46,087
February	26	78,237	26	66,648
January	23	54,709	25	57,589
December	20	46,569	17	43,041
November	22	56,983	22	50,043
October	24	59,136	26	61,673
September	21	60,956	22	54,537
August	24	62,574	26	63,874
July, 1928	26	59,204	27	61,976

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	30	77,176	87	274,299
December	27	65,306	104	358,823
November	28	68,030	108	332,315
October	36	88,056	118	385,367
September	47	131,512	101	323,955
August	37	87,502	74	275,017
July	36	72,793	87	259,450
June	35	75,614	78	243,391
May	37	79,121	79	220,456
April, 1929	36	82,330	93	294,062

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	185	601,710	176	596,007
December	212	619,119	178	589,551
November	225	676,209	215	664,661
September	259	621,704	225	605,808
August	204	583,568	185	554,520
July	203	705,042	169	620,250
June	186	574,459	159	582,247
May	167	604,274	224	597,519
April, 1929	175	546,939	184	650,172

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1930	158	644,015	149	630,336
December	182	632,677	148	558,136
November	161	620,878	143	579,803
October	179	696,620	164	667,367
September	151	563,770	134	559,772
August	196	723,330	168	669,499
July	173	680,770	153	621,762
June	167	643,580	147	584,361
May	179	643,864	165	613,836
April, 1929	173	673,174	153	606,246

Port Arthur

(Including Domestic)

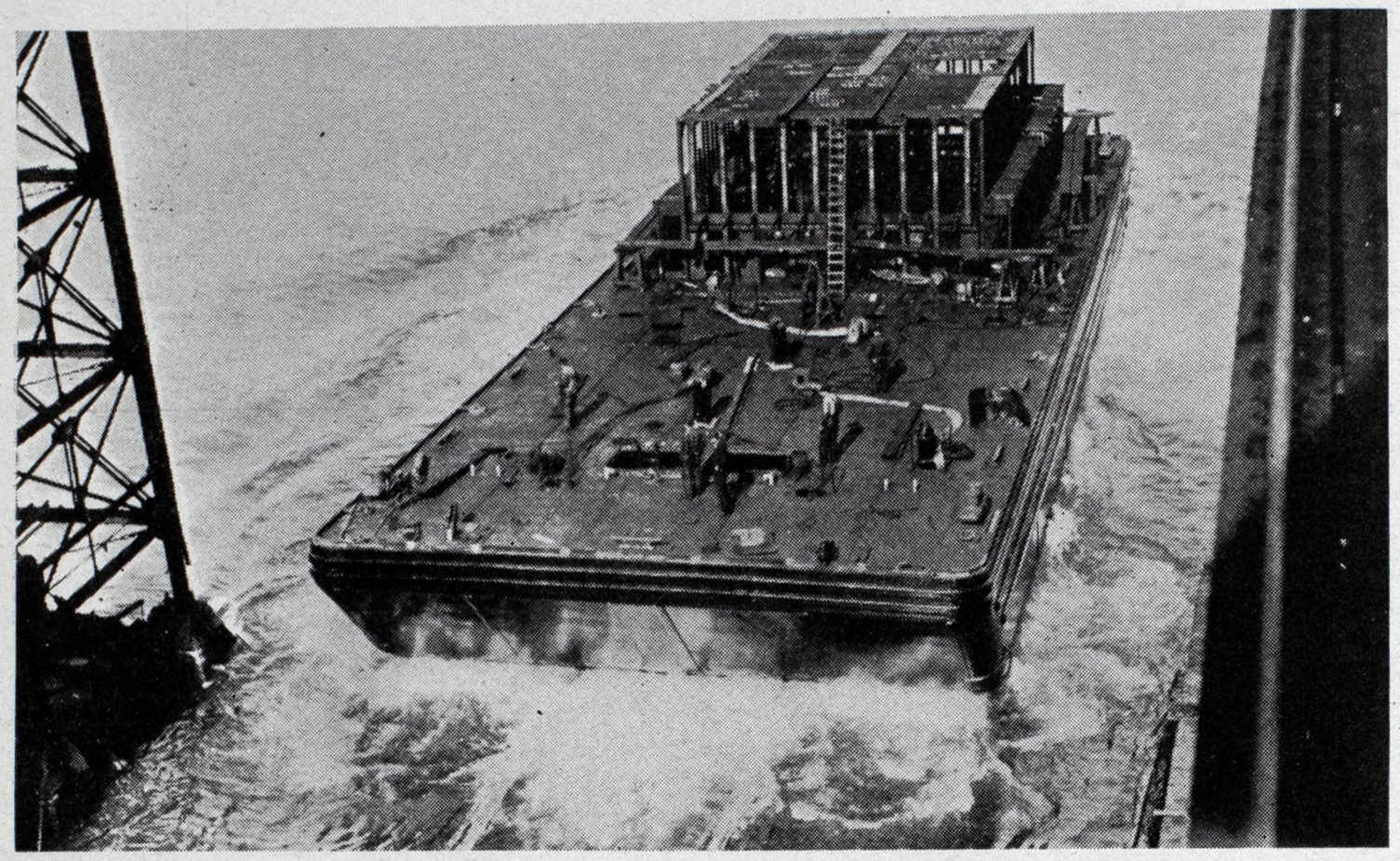
Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1929	22	76,344	26	87,941
April	21	79,267	23	81,991
March	25	76,152	27	81,778
February	16	53,310	21	68,705
January	22	68,758	24	76,496
December	21	65,710	14	43,776
November	23	71,313	23	69,425
October	19	58,857	19	58,686
September	22	73,785	24	79,696
August, 1928	25	78,765	23	72,389

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 68 of 237,829 net tons entered and 79 of 277,469 net tons cleared for the month of January.

Launch Floating Derrick

THE floating derrick LOS ANGELES for the Merritt, Chapman & Scott Corp. was launched Feb. 1 at the Union plant of the Bethlehem Shipbuilding Corp., San Francisco.

With a lifting capacity of 90 tons overside, the LOS ANGELES will round-out "Black Horse" heavy equipment service on the Pacific coast, and will make possible loading at New York, unloading at Los Angeles and vice versa at combination rate. The LOS ANGELES is one of the largest floating derricks in Pacific coast service and will be based at San Pedro, Calif., headquarters of the Merritt, Chapman & Scott fleet in those waters.



LAUNCHING OF FLOATING DERRICK LOS ANGELES AT UNION PLANT BETHLEHEM SHIPBUILDING CORP., SAN FRANCISCO, FEB. 1—FOR MERRITT, CHAPMAN & SCOTT.

The hull is steel throughout, including guards and deck rails, bottom rounded at ends with vertical sides. It is 125 feet extreme length and 124 feet, 5½ inches molded length. Extreme width outside fenders is 45 feet, 6 inches, and 45 feet molded width. At the midships the LOS ANGELES has a depth of 12 feet and from ends to base line is 13 feet.

The deck house is 51 feet, 10 inches long, 32 feet, 4 inches wide and 15 feet, 6 inches high. Engine and boiler compartments occupy the forward part of the house to the roof of the structure. An intermediate deck is located aft of the engine room in which galley, mess room and crew quarters are found, there being quarters for a crew of ten. Officers' quarters are in four rooms with provision for two men in each.

Hoisting engines were built by the Lambert Hoisting Engine Co., operated on multiple sheave locks and can swing 90 tons over side. The main engine has four drums while auxiliary engines have eight drums and four mooring drums. The boiler is of vertical type and burns oil as fuel.

The derrick has a 95-foot steel boom with a steel A frame, 98 feet above deck.

With the addition of this derrick, Merritt, Chapman & Scott will have at the San Pedro base every type of service vessel operating in salvage work, lightering, heavy towing, special dredging and general construction ashore and afloat. Increased facilities on the Pacific coast was prompted by rapidly growing traffic at the Port of Los Angeles.

What the British Are Doing

THREE of the six motor tankers each of 10,000 tons deadweight, ordered some time ago by the Anglo Persian Oil Co., are to be constructed on the Clyde and three on the Tyne. Of those to be built on the Clyde, two will be by Lithgows of Port Glasgow and one by the Greenock Dockyard Co. All three will have Harland-Kincaid B. & W. engines made by John G. Kincaid & Co. of Greenock. Another oil tanker of about 11,250 tons deadweight is being built by the Blythswood Shipbuilding Co. Ltd. Scotland and supplied by Kincaid with similar engines of 3300 brake horsepower for the Bermuth, Lanbckeland Shipping Co. Inc., New York. Of the launches in January, the Greenock Dockyard Co. Ltd. were responsible for a cargo steamer of about 7000 tons built for the Clan Line Steamers Ltd. of Glasgow and there was also launched the PRINCESS ELIZABETH, a twin-screw turbine steamer of 5000 tons, built and engined by the Fairfield Shipbuilding and Engineering Co. Ltd. Govan for the Canadian Pacific Railway Co. of Vancouver.

* * *

A DOUBLE launch took place recently from the shipbuilding yard of Smiths Dock Co. Ltd., South Bank on Tees when two finely modeled steel screw steam trawlers LUNE and FANE, which have been built to the order of the Wyre Steam Trawling Co. Ltd. of Fleetwood, took the water. The vessels are over 140 feet long and are built to the highest class of British corporation requirements. The machinery was constructed by Smiths at their River Tees Dockyard. Smith's first launch of the year was the steel screw steamer KYLOE built to the order of the Sharp Steamship Co. Ltd. Newcastle on Tyne. The vessel is over 315 feet long, is designed to carry about 4600 tons on a light draught and is to be classed 100 A1. She has been specially designed as a self trimming collier with large hatches and clear holds. In 1929 the launches from Smiths Dockyard averaged one per week.

* * *

WILLIAM Gray & Co. Ltd. of West Hartlepool have launched the steel screw steamer WELCOMBE, built to the order of Pyman Brothers Ltd. London. The vessel is of the open shelter deck type taking the highest class in Lloyds Register and is 434 feet 9 inches long and 55 feet

beam. The propelling machinery will be supplied by the Central Marine engine works to the builders and will consist of reciprocating engines of the balanced quadruple inverted direct acting surface condensing type.

* * *

IRVINE'S Shipbuilding & Dry Docks Co. Ltd. of London has decided to go into liquidation. The chairman R. A. Workman, at an extra meeting of the shareholders, said the only prospect of reconstruction was that a group of men with the necessary capital should come forward and undertake losses for a certain period waiting for a revival to come along. A minimum of £60,000 would be required to give the company any chance at all. A shareholder at the meeting suggested that a Board of Trade inquiry into the management and history of the company should take place but a poll was taken which resulted in a majority for the voluntary liquidation of the company.

* * *

IN THE South Wales ports of the Great Western Railway Co. it is estimated that at least 50 vessels are laid up and their crews numbering over 1000 have been paid off because shipowners cannot obtain freights.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to February 18, 1930 on Future Loadings

NOTE: FREIGHT RATES STEADY WITH SLIGHT CHANGE

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	General cargo 180 lbs.	††Finished steel Freight	REMARKS Offered
Liverpool	1s 6d	$0.65	0.45	0.18	$0.50	$0.90	$8.00T***	Fair
London	1s 6d	0.65	0.45	0.18	0.50	0.90	8.00T***	Fair
Oslo	$0.11	0.45	0.50	0.30	0.42½	0.85	8.00T	Poor
Copenhagen	0.11	0.45	0.50	0.30	0.45	0.90	8.00T	Poor
xHamburg	0.08	0.32½	0.45	0.18	0.50	0.90	10.00T	Poor
xBremen	0.09	0.45	0.45	0.19	0.50	0.90	10.00T	Fair
Rotterdam and Amsterdam	0.09	0.32½	0.45	0.18	0.45	0.80	9.50T	Poor
Antwerp	0.09	.....	0.45	0.18	0.45	0.80	9.50T	Fair
Havre	0.10	0.37½	0.31	0.30	0.45	0.80	9.00T	Fair
Bordeaux	0.10	0.37½	0.31	0.30	0.45	0.80	9.00T	Fair
Barcelona	....	0.50	0.30	10.00 bags	—12.00T—		12.00T	Fair
Lisbon	....	0.65	0.45	8.00T bags	—23.00T—		8.00T	Fair
Marseilles	....	0.65	0.40	7.00 bags	—23.00T—		8.00T	Fair
Genoa	0.15	14.25T	0.50	9.00	—23.00T—		11.50T	Fair
Naples	0.15	14.25T	0.50	9.00	—23.00T—		11.50T	Fair
Constantinople	0.27	20.00T	0.75	0.40½	—24.00T—		11.50T	Fair
Alexandria	....	20.00T	0.75	0.40½	—24.00T—		11.50T	Fair
Algiers	....	0.75	0.60	8.0T bags	—23.00T—		11.50T	Fair
***Dakar	....	20.40	....	18.60T	—27.60T—		13.80T	Fair
Capetown	....	18.00	....	13.00 per 2240 lbs.	20.00		20.00	Fair
Buenos Aires	....	22.00T	....	....	20 to 22.00T†		8.00 to 8.80T	Fair
**Rio de Janeiro	....	22.00T	....	....	30 to 22.00T†		7.00 to 7.70T†	Fair
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Fair
Havana	0.30*	0.50	....	0.30*	0.61	1.33	10.00	Fair
Vera Cruz	0.35	0.40	0.50	0.35	x		0.25 to 0.35	Fair
Valparaiso	....	1.07	....	0.70	....	....	10.00T	Fair
San Francisco	....	0.45 to 0.90	....	0.40 to 1.10	....	....	0.25 to 0.30	Very good
*Sydney	....	20.00	1.25	15.00	17.50 to 25.00		9.00 and 12.00	Poor
(x)Calcutta	....	....	0.60	to Bombay not Calcutta	—20.00T—		10.00T	Fair

T—Ton. ‡Per quarter of 480 lbs. †Landed. ‡‡Heavy products limited in length. *Extra charge for wharfage.
**Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion. ***Plus 15 per cent.
xNo general cargo rates to Vera Cruz.
*Flour to Sydney—$22.50. General cargo—$17.50 to $27.50. Finished steel—$9.50 and $12.50.
***Rates, effective at once, to Dakar, will be based on whether the company makes a contract. Rates without a contract will be about 20 per cent higher. With a contract the same rates as last month apply.
(x)General cargo to Calcutta is $18 up to June 30. After June 30 it will be $20.

From North Pacific Ports to	Lumber Per m. t.
San Francisco	$4.00 to 4.25
South California	4.00 to 4.50
Hawaiian Islands	9.00 to 10.00
New Zealand	16.00 to 18.00
Sydney	11.00 to 12.00
Melbourne-Adelaide	11.50 to 13.00
Peru-Chile	13.00 to 14.00
South Africa	17.00 to 20.00
Cuba	13.00 to 14.00
United Kingdom	52s 6d to 60s
Baltimore-Boston range	$10.00 to 11.00
Florida Range	15.00 to 16.00
Buenos Aires	16.00 to 20.00
South America — East Coast	15.00 to 20.00
South America — West Coast	13.00 to 14.00
China	7.00 to 7.50
Japan	6.00 to 7.00
Japan (logs)	7.00 to 10.00

Flour and Wheat

U. K. and Continent (gross tons)	20s to 25s
Oriental Ports (net tons)	$3.00 to 4.50

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5½c per barrel. The coal strike in Britain is now settled and freight rates or bunker prices for coal or pig iron are again quoted.

General cargo rates to Havana change daily and are omitted for the time being.

Rates to Calcutta are subject to change without notice. Cotton goes only to Bombay. Landing charge of $2.00 per freight ton at Valparaiso.

Principal Rates To and From United Kingdom

	s	d
Grain, River Plate to United Kingdom	13	3
Coal, South Wales to Near East	8	0
Coal, United Kingdom to Buenos Aires	14	9
Manganese Ore, Poti to Philadelphia	$3.85	
Pig iron, United Kingdom to New York or Philadelphia	12	6
Iron ore, Bilbao to Cardiff	6	0
Iron ore, Huelva to Phila. or Balto	11	9

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
April 18, 1929	5.00@5.50	1.10	4.92
May 18	4.00@5.50	1.10	4.92
June 18	4.75@5.25	1.10	4.92
July 18	4.75@5.25	1.10	4.92
Aug. 18	4.75	1.10	4.92
Sept. 18	5.00@5.25	1.10	4.92
Oct. 18	5.00@5.25	1.10	4.92
Nov. 18	5.00@5.25	1.10	4.92
Dec. 18	5.00@5.25	1.10	4.92
Jan. 18	5.00@5.25	1.10	4.92
Feb. 18, 1930	5.00@5.25	1.10	4.92

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
April 18, 1929	5.00@5.50	1.05@1.10	5.12
May 18	5.00@5.50	1.05@1.10	5.12
June 18	4.90@5.30	1.05@1.10	5.12
July 18	4.90@5.25	1.10	4.88
Aug. 18	4.90@5.25	1.10	4.88
Sept 18	4.90@5.25	1.10	4.88
Oct. 18	4.90@5.25	1.10	4.88
Nov. 18	4.90@5.25	1.10	4.88
Dec. 18	4.90@5.25	1.10	4.88
Jan. 18	4.90@5.25	1.10	4.88
Feb. 18, 1930	5.00@5.25	1.10	4.88

Other Ports

Boston, coal, per ton	$7.46
Boston, oil, f. a. s., per barrel	1.12
Hampton Roads, coal, per ton, f.o.b., piers	$4.50 to 4.75
Feb. 18 — Cardiff, coal, per ton	14s 6d
London, coal, per ton	—s —d
Antwerp, coal, per ton	21s 9d
Antwerp, Fuel oil, per ton	80s0d
Antwerp, Diesel oil, per ton	87s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

ON FEBRUARY 12 the United States Lines Inc. presented plans and specifications to the shipping board for the construction of two new super liners for the North Atlantic passenger trade. These vessels are to cost approximately $25,000,000 each and it is estimated that they will make the run between New York and Cherbourg in less than five days. These plans were presented to the shipping board by Paul W. Chapman, president, and Glenn Snider, secretary. These vessels are being constructed under the terms of the sale of the LEVIATHAN and her sister ships.

These new vessels are to be equipped for ship-to-shore air mail services and according to reports are to be the last word in safety, speed, and comfort. These vessels are designed for maintaining a speed of 28½ knots and are to be in excess of 50,000 gross tons. The length is to be 962 feet and the beam 107 feet 6 inches. The new super liners, according to Mr. Chapman, are to be of stream line design with bulbous bow and semi cruiser stern. A catapult device for airplanes is to be mounted between the funnels. Theodore E. Ferris was appointed by Mr. Chapman of the United States lines as chief naval architect and marine engineer to design and build the vessels. The work of designing has progressed so that the United States Lines Inc. are in readiness to begin actual construction of the vessels upon approval by the shipping board.

In was stated that nothing like the proposed ships have ever been undertaken in this country. The engineering work involved in the plans a technical staff of more than 60 people. Under the terms of the Jones-White Act, three-fourths of the cost of constructing these vessels may be borrowed under the government's interest rates. Before such loans are made, however, the plan must be approved by the board and also by the navy to ascertain whether or not the vessels would be suitable as naval auxiliaries in emergency.

Considerable time has been spent by representatives of the United States Lines Inc. in foreign shipbuilding yards, classification societies, and with various architects and engineers in order that the latest developments might be incorporated in these new ships to make them the finest afloat.

Order Electric Liners

The Peninsular & Oriental Co. has placed a contract for two 20,000 ton turboelectric liners for the Australian service with Vickers-Armstrong, Ltd., of Barrow. According to a recent statement by Lord Inchcape, chairman of the company, the new vessels are to have large saloon passenger accommodations and every cabin is to have a port hole which opens to the sea. A comfortable third class cabin, with cargo and refrigerator space are also to be incorporated in the vessels.

The highly satisfactory performance of the new turboelectric liner VICEROY OF INDIA, in the Bombay mail service of this line, has had a great deal to do it is said with the placing of this contract.

Erie Orders Tug Boats

Order for four new tug boats has been placed by the Erie railroad. These vessels are to be diesel electric powered, and are being built by Pusey & Jones, Wilmington, Del. The cost is to be $1,000,000 for the four vessels.

New Tankers Ordered

The B. L. Shipping Co. Inc., of New York, has placed a contract abroad for the construction of a tanker of 11,250 tons deadweight. The vessel is to have Burmeister & Wain engines of 3300 horsepower. These engines are to be built by John G. Kincaid & Co., of Grennock.

Launch Morro Castle

The turbine electric liner MORRO CASTLE, building at the Newport News Shipbuilding & Dry Dock Co. (company's Hull No. 337) for the Ward line is to be launched on March 5, at about 12:00 o'clock noon.

She is the first of two passenger and freight vessels under construction for the same company. The second is the ORIENTE, the launching of which will take place in the near future.

These vessels, twin screw ocean liners of 20-knot speed, were designed by Theodore E. Ferris, New York naval architect. They are 508 feet long, 70 feet 9 inches beam and 39 feet in depth. The gross tonnage will be about 11,300. Total shaft horsepower will be 16,000. Turbine generating sets and propelling motors are furnished by the General Electric Co. The boilers are of the watertube type, burning oil, are supplied by the Babcock & Wilcox Co.

When completed they will operate between New York and Havana in the Ward line service. They will be the fastest and most luxurious vessels ever placed in this run.

Reconditioning Loan

A loan amounting to $222,750 to be used in aid of reconditioning the steamers EXILONA, EXARCH and EXCELSIOR was granted the Export Steamship Corp., New York, by the shipping board on Feb. 5. The vessels are former shipping board freight steamers and have been made over into combination passenger and cargo steamers for the New York-Alexandria trade. The conversions took place in the Fletcher yard of the United Dry Docks, Inc.

Under the terms of the loan agreement, repayment will be made to the board over a period of 10 years, with interest payable semi-annually, at the rate authorized by the Jones-White Act.

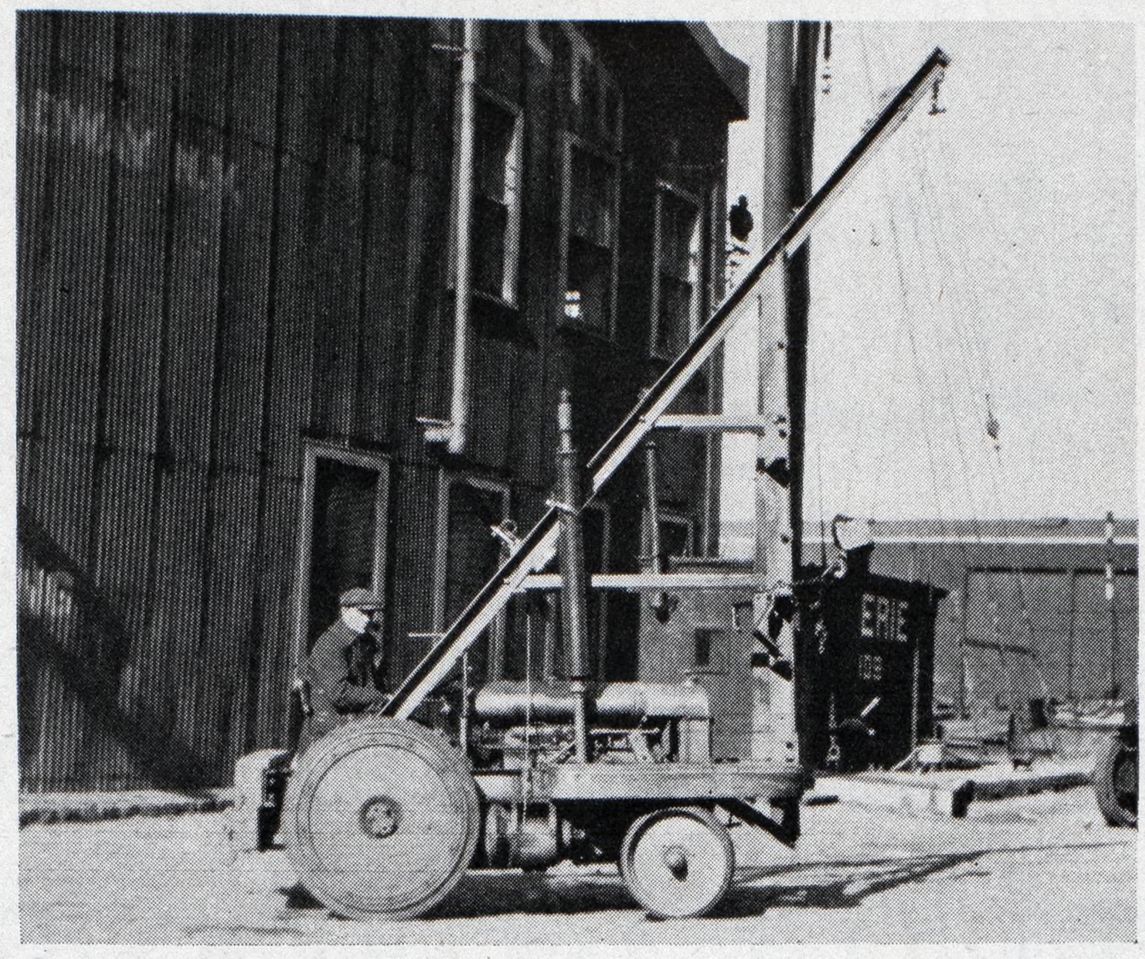
Panama Mail Line Bids

Tentative bids for the construction of three 18-knot combination passenger and cargo vessels for operation between San Francisco and New York have been asked by the Panama Mail line. The cost of the vessels has been estimated at approximately $3,500,000 each. Construction of the ships which is dependent upon receipt of an ocean mail contract from the post office department includes accomodations for more than 500 passengers. The new ships are to be larger and faster than the vessels now operated by the company. It is expected that shipyards on both the Atlantic and Pacific coasts will submit tenders and there is excellent possibility that the west coast yards may obtain the contract.

Equipment Used Afloat, Ashore

Portable Crane for Tiering Cargo—Dock Space Saved—Hand Labor Reduced—Flexible in Service—Conveyors Used to Advantage

CONGESTED docks are a cause of uneconomical handling of cargo. Better or additional facilities are not always available. An additional dock may be obtained in another part of the port, but disregarding traffic considerations the cost of the dock and additional time and expense of shifting steamers make this method of meeting the situation uneconomical. Faced with these conditions shipping lines have been forced to tier their cargoes. Hand tiering is expensive, so resort has been made to various kinds of mechanical equipment. Portable elevators or stackers which are used extensively in many industries for economizing on storage space are used by some lines. Large heavy packages, such as rolls of newsprint and hogsheads of tobacco are tiered economically with this type of equipment. High lift trucks and fork type trucks are also used for tiering. A recent installation of a fork type truck on a marine terminal handles bales of woodpulp. In this case consideration was also given to the fact that tiering by means of this truck was cheaper than using space available if the bales were trucked a long distance. Portable conveyors are used in tiering bags of sugar and similar freight.



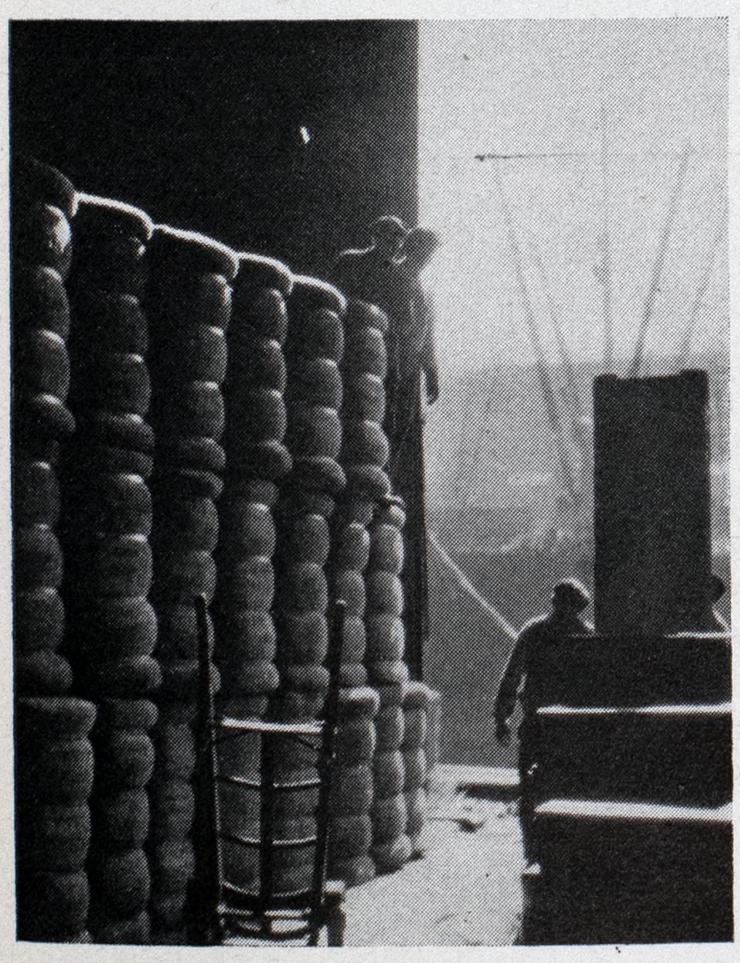
PORTABLE CRANE USED FOR TIERING BALES AT TERMINALS

A New York steamship company met the problem of dock congestion by buying five gasoline propelled portable cranes for use in tier bales of gunnies and other cargoes. Large cargoes are discharged onto a relatively small dock which could not take care of the cargoes without tiering above the usual height. Tiering by hand was difficult because of the limited number of men that could get around a bale. This slow method delayed the discharge of the ships. Time is an important factor in operating the large ships in this service and it would have been inadvisable to shift to other terminals.

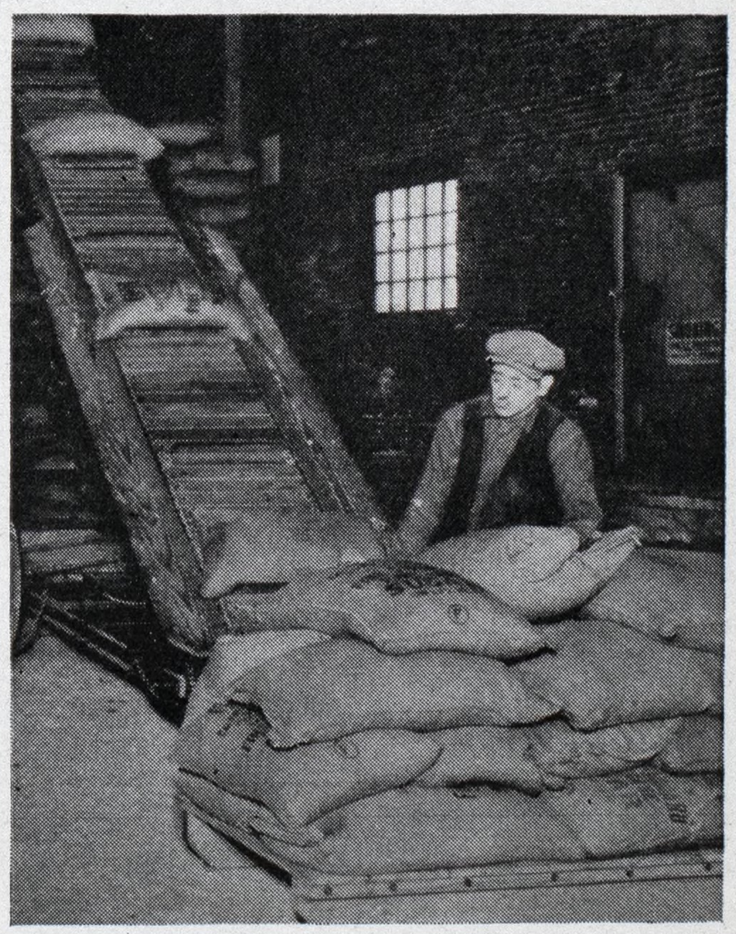
The five cranes used in tiering the gunnies are Fordsons, equipped with a special crane designed by the Otis Engine Corp. The top of the boom is 16½ feet high. The capacity is 4000 pounds. Gasoline consumption in continuous operation is seven-eights of a gallon per hour. One gallon of oil will last approximately five days in continuous operation. The construction of the crane is shown in the accompanying illustration. Woolen and jute are also tiered by the cranes.

The bales are picked up by placing two hooks or grabs against the bales and then operating the hoist. The hooks are pressed against the bale by the pull of the hoisting cable and hold it firmly as it is raised to the proper height. The two helpers or hook men, climb to the height necessary to place the bale and remove the hooks by means of stops located on the framework of the crane. In this way bales weighing as much as 1700 pounds are easily tiered to a height of three bales placed on end. Three men are in the crew, crane operator and two hook men. Formerly one bale was placed on the flat and one on end using six men. The new method economizes dock space by piling on end rather than on the flat, as well as piling the bales higher. Furthermore, the number of bales handled per hatch hour has been materially increased. This has resulted in a saving of labor and has reduced cost.

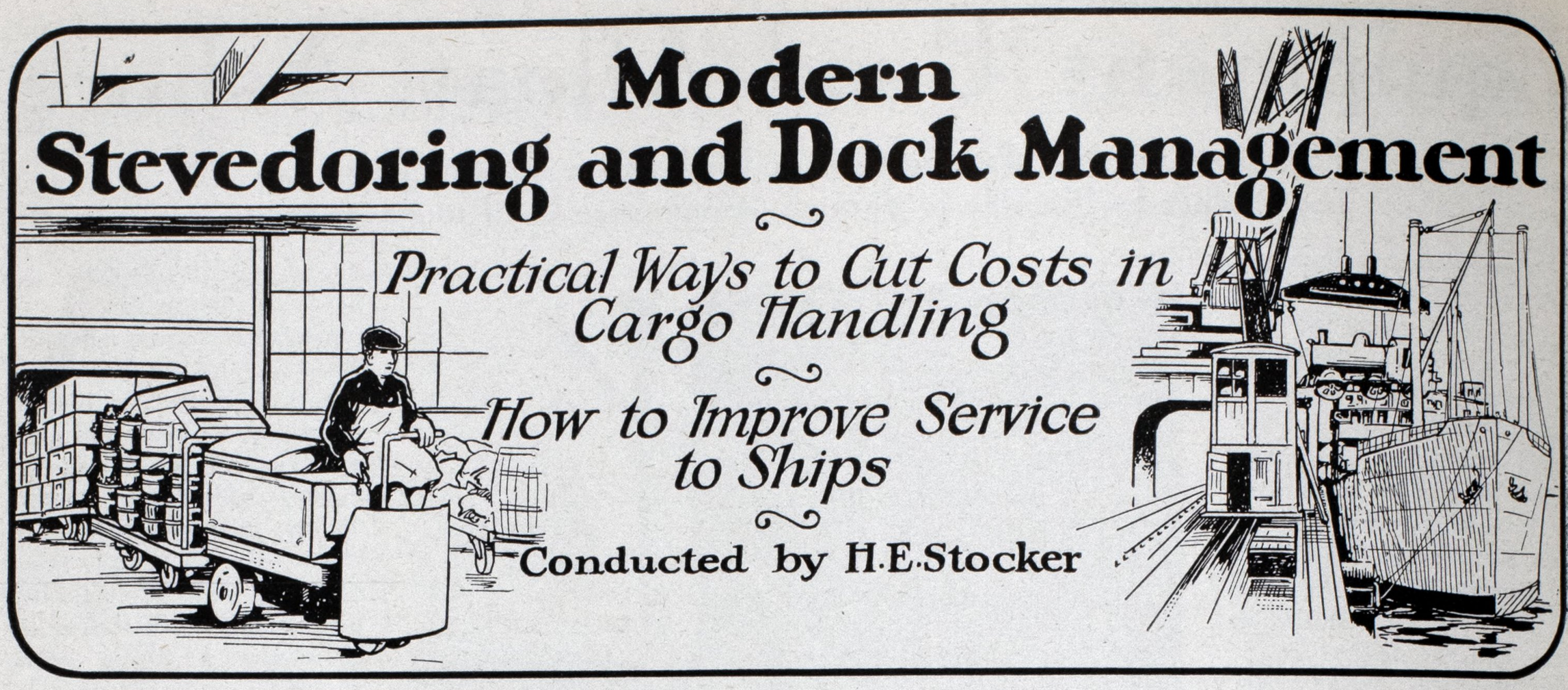
The cranes are provided with spark arresters and an arrangement for cooling the exhaust gases. A gas diluter is attached to the exhaust to reduce the amount of gas per cubic foot of exhaust and this, together with a high vertical exhaust pipe rather than one of conventional design, has resulted in a satisfactory operation even when most of the doors of the dock are closed, without danger or inconvenience.



BALES TIERED BY PORTABLE CRANE SAVES VALUABLE DOCK SPACE



CONVEYORS ARE USED FOR TIERING BEYOND RANGE OF PORTABLE CRANES



Waterfront Labor Conditions Aided By Employe Representation

By Robert C. Hill

FOR nine years there has been peace on the Seattle waterfront. This is a notable change from the previous period, 1908-1920, when, industrial warfare ranged almost incessantly. The industry was blighted by a vicious circle of union domination, strike, employers in control, another walkout and return to the closed shop. From the standpoint of both employers and men conditions were intolerable. Both sustained serious losses. Ships were delayed, cargo was pilfered and damaged, men soldiered on the job, the port was given a bad reputation. On the other hand longshoremen and dock workers had only casual employment. Under the most favorable conditions, the industry was overmanned, at times some employers were unfair and arbitrary and even the most efficient workers were unable to make a decent living.

The old order has passed into history. Today longshoring and trucking is a respectable and well paid occupation on the Seattle front. As a rule the men are satisfied with the present system. There is now a spirit of harmony and co-operation between employer and employe that has worked to the advantage of all.

This reformation in industrial relations has been accomplished not through the closed shop or the open shop but by joint organization sometimes called the "joint shop." It is similar to the system adopted in some factory industries but has been made effective here in spite of a number of handicaps not found in other lines of work. For instance waterfront employment is of a casual nature and many different employers have had to be brought into line instead of a single employer as is usual in a stable industry.

The "joint shop" in Seattle has successfully stabilized the relations between employers and men, decasualized the work, assured ships of certain and quick dispatch and in general made of the local waterfront a place of peace and industry instead of war and wastage.

Employers Association Organized in 1908

The waterfront employers of Seattle, a voluntary association of steamship, stevedore and dock companies, was organized in 1908 with the co-operative object of improving industrial conditions and relations in local shipping and cargo handling. Its members bargained collectively with the employes but it was not always possible to prevent strikes. In 1908 a prolonged and bitter labor conflict cost both sides many thousands of dollars. In 1916 a similar experience proved very expensive. When the men returned to work after a disastrous defeat, they were in ill humor and dissatisfied. The following year, with the war shortage of labor and great industrial activity, brought conditions highly unsatisfactory to employers. Representatives of the latter twice went to Washington, to confer with the national adjustment commission on longshoring. In 1918 the federal government took waterfront employment out of the hands of both men and companies. The general strike in 1919 threatened to completely paralyze the entire shipping industry in Seattle.

Temporary peace was established until April 1920 when a new agreement was signed in which the list system of dispatching was abandoned. Within a month another strike was called to restore the list. Conditions were rapidly growing worse with each side striving to gain control. Finally in June 1920 the Pacific Steamship Co. organized a dock council among its own men providing for joint representation.

This plan seemed to meet the situation so ideally that within a short time the "joint shop" system was generally adopted under the leader-

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This original study and statement of what has been done at the great Northwest port of Seattle to solve the problems of peaceful and efficient cargo handling, benefiting both longshoreman and shipowner has been prepared for MARINE REVIEW at the request of the Editor by Robert C. Hill from personal observation and close contact with one of those chiefly responsible for the plan and its successful operation.

ship of the waterfront employers of Seattle. It has since been in effect. Starting as an experiment in industrial relations, it has passed through many crises until now it apparently has established itself as a permanent institution. Neither local employers nor men would be willing to return to former conditions.

In some degree the Seattle plan has helped to solve the waterfront problems of Vancouver, B. C., Portland, Oreg. and Los Angeles although the system has not been adopted in entirety either as to working details or principles. The Seattle waterfront dispatching hall has also served as a model for the central casting bureau of the motion picture producers' association at Los Angeles.

Orderly Plan for Co-operation

Briefly, the "joint shop" is an orderly plan for co-operative control by management and men of wages, hours and working conditions in addition to providing a system for regularizing longshore work. In other words the idea is to decasualize the industry by furnishing efficient, industrious and regular workers with full time employment as far as is possible in a calling so seasonal and irregular.

One of the first problems of the "joint shop" organization was to eliminate surplus labor. At one time during a previous period there were probably 5000 waterfront workers in Seattle with steady work for not more than one-third that number. It was at first difficult to determine the point at which the principle of "no unnecessary men" should be made effective. In September 1920, 1420 longshoremen were registered as eligible workers at the central dispatching hall where the reserve of men was maintained. Eleven months later this number was reduced to 612.

When the plan was first proposed, the employers requesting the men for a round table conference, many of the workers were openly suspicious if not antagonistic. They still had in mind the old slogan: "What's good for the boss is bad for the men; what's good for the men is bad for the boss."

Much loud applause greeted the remarks of a brawny longshore worker who jumped to his feet and shouted:

"What you say about this joint organization business may be all right. But what we want to know here tonight is 'When do we eat?' "

The secret ballot following resulted in the adoption of the proposition by a vote of 319 for and 209 against. At a subsequent meeting the constitution and bylaws were approved by a three to two vote. And the answer to the longshoreman's question of "When do we eat?" has since been "Three times a day, every day in the year."

The constitution of the joint organization plan provides for a joint executive committee composed of 15 men selected by secret ballot and 15 representatives of employers. Three important joint committees, each consisting of four men and four employers, carry much responsibility. Of these standing committees, the joint employment committee is in charge of all matters relating to employment and the conduct of the dispatching hall. The joint standard practice committee handles operation problems and questions of hours and wages while the joint safety committee devises methods of reducing risk and preventing accidents.

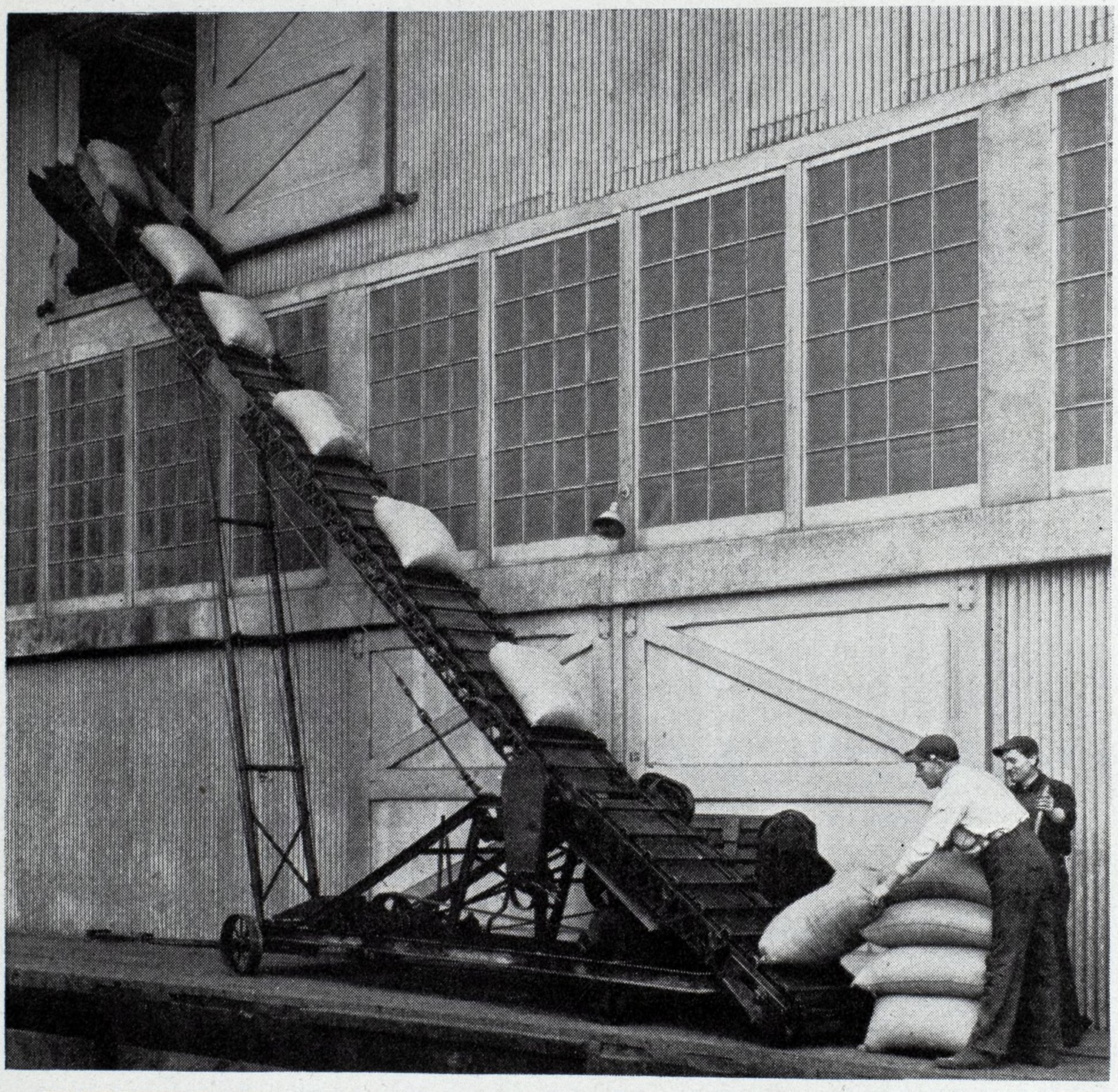
Steady Work Now Possible

Today on the Seattle waterfront approximately 1750 longshoremen and truckers have steady jobs which employ them about 160 hours a month. Three of the larger employers maintain their own gangs. In other words they keep on call only sufficient men to handle their regular work. Others are assigned through the central dispatching hall out of which at present 1000 men are sent to various jobs as required. Of this number there are 36 regular gangs in which each man knows his position and knowing his fellow workmen is able to give more efficient service. From the regular register board at the hall other gangs are recruited as occasion demands. Work is assigned not on the

JOINT SAFETY COMMITTEE OF LONGSHOREMEN AND EMPLOYERS ON SEATTLE WATERFRONT. BEGINNING LEFT—PADDY BURNS, JOE WEBER, H. B. O'DONNELL, F. P. FOISIE, R. J. ACHESON, T. R. RICHARDSON, A. WHITEHEAD, M. G. RINGENBERG, JOSEPH WADE, ALTERNATE CHAIRMAN, CARL STROUT, HARRY THOMPSON, W. F. VARNELL, W. D. VANDERBILT, J. C. DOLBECK, WM. H. MOORE

basis of seniority but on earnings, it being the desire to equalize the income of each worker as much as possible.

Several years ago, when the surplus of labor was pronounced, statistics show that the average monthly earnings of Seattle longshoremen were only $60 and those of dock workers $40. In 1929 the figures of the joint organization will prove that the workers averaged $1900 during last year with steady jobs requiring about two-thirds of their time. The going wage is 90 cents per hour for regular time and $1.35 for overtime. In Seattle there is much excess over-



HANDLING SACKS OF FLOUR WITH CONVEYOR ON SEATTLE WATER FRONT

time for the reason that this is a turn around port for many regular lines and ships require quick dispatch.

At the hall a casual list is maintained from which extra men are drawn as surplus labor is required. Selections are carefully made and a man's chance of becoming a regular depends largely on the showing he makes and the recommendations he receives from both fellow workers and his superiors. Of all the labor along the local waterfront, statistics show that 84 per cent are married and 68 per cent own their homes. A majority of longshoremen in Seattle have telephones in their homes and own automobiles. These facilities are of major importance in keeping the worker in touch with his job and in reaching it without needless delay.

The system has been in operation sufficient time to demonstrate its practicability. It is now considered no longer an experiment. It has proved itself by results. The joint committee meets once a month. All decisions are subject to review by this joint executive committee composed of equal numbers of employers and employes. Workers receive pay for time off in attending meetings. They are free to speak their minds and offer criticism with no fear of meeting discrimination on the job. Men discharged or who have grievances have the right to appeal to the executive committee where differences are discussed, sometimes with considerable force, but usually in a spirit of fairness and co-operation.

Waterfront Hazards Greatly Reduced

One of the main objects of the system is to reduce the waterfront hazard and this has made much progress with the help of the men. A careless worker is severely scored by his fellows. "Safety first" is an important slogan. An experienced man is regularly employed to board all ships to inspect and pass upon the gear and equipment before work is started. This campaign is bringing results among which are reduced insurance rates.

Expenses are met by an assessment against the payrolls of stevedores and dock companies, also a small levy against the ship based on the tonnage of cargo handled. The cost of maintaining the Seattle plan of joint shop has been considerable but those who bear the burden are more than satisfied. It is asserted that the expense of breaking up a severe strike, such as that of 1916 lasting four months, would cover all the cost of the present peace program for ten years.

The dispatching hall affords a central meeting place although many of the members of gangs receive orders by telephone, thus avoiding lost time in waiting. The hall is furnished with conveniences and recreational facilities. From it the men are quickly dispatched to the job. Before placing orders for men, the stevedore and dock employers have collected complete information, beginning with wireless reports of ship's arrivals, stowage plans, kind and quantity of cargo, its distribution by hatches, ships' gear, time and place of docking and the number of men required. Consequently the waterfront worker is not forced to go from dock to dock seeking employment, waiting many hours for delayed ships to arrive and then taking chances of being selected for a job by the foreman. Some of the gang plan advantages are:

Each man has a sure, steady job in his gang from which he is "fired" only for cause.

Earnings of gangs are equalized.

It is easier to arrange for sufficient labor, without surplus, by gangs than by individuals.

Responsibility for satisfactory work is better fixed in the steady gang than in shifting units.

There is a regular supply of skilled men available for work, and obligated to take it as it comes.

In addition to the gang system, which is of major importance, the joint organization plan embraces the following outstanding advantages:

Men are not required to waste their time awaiting a job; the dispatching hall notifies them in advance.

The dispatching hall is becoming the central pay station at a saving of time and convenience to the men. It is also a service that employers have found of advantage.

The development of statistical information has based decisions on fact and reason instead of opinion and emotion.

Employers and employes through regular and frequent contact in committees develop a mutual respect and forbearance.

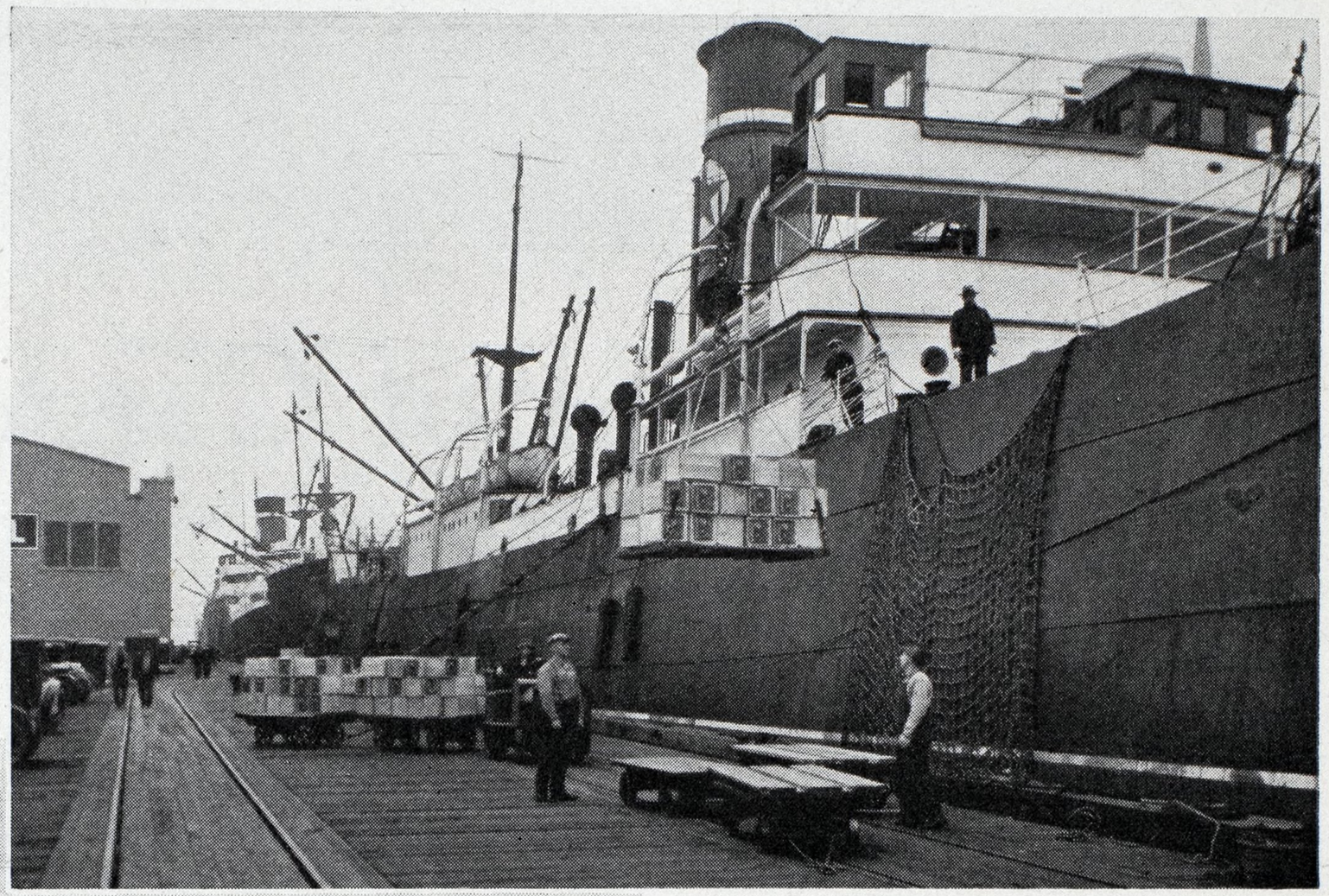
Pilferage is reduced; cargo is handled more carefully.

More important than the forgoing—men's earnings have been increased without adding to the ship's expense.

During 1928, 89,425 longshoremen and 39,442 truckers were dispatched from the reserve maintained at the

hall. The daily average was over 400. The maximum number in one day was 909. The 900 to 1000 men, registered and extra at the hall, were dispatched about 125 times during the year. During the same 12-month period, 83,665 men were paid $694,305 in wages, either by check or cash at the dispatching hall. This was a daily average of nearly 300 men paid $2300.

There are few critics but they are in a small minority. Weaknesses of the system are apparently more in the operation than inherent. Compared with other Pacific coast ports, the man-hour tonnage at Seattle is not the highest although the Seattle record is considered creditable in view of the port's industrial handicaps and the class of cargo required to be handled in a quick turn-around. There has been some complaint regarding discipline but on the whole it is better than that in other ports, although it might be improved. It is asserted that in a few individual cases men are inclined to let down on the job and efficiency is lowered because the workers are assured of work unless they are flagrantly disobedient or inefficient. Critics are always to be found in the ranks of the men but the great majority would not return to the old system. Union officials are not sympathetic to the movement largely because it fails to recognize the union. When men are registered no questions are asked as to union membership although it is known that about 90 per cent of the Seattle waterfront workers belong to labor unions.



SEATTLE WATERFRONT—LOADING WASHINGTON APPLES FOR EUROPE AND SOUTH AMERICA

SEATTLE WATERFRONT—LOADING LUMBER AND PILING—USING MODERN EQUIPMENT WHERE RAIL MEETS SHIP

Among the changes adopted here is the abolition of pyramiding of penalties. Shifting of the meal hour without penalty at the pleasure of the ship has saved considerable expense and given ships faster dispatch. Standby time is rapidly disappearing due to accurate methodical dispatching arrangements which are on a 24-hour service basis.

Compared with the past, today's conditions are much improved for the worker summarized as follows:

The waterfront has been the catch-all for casual labor, the last resort of the "down and outer."

The longshoreman's job depended largely on the individual good-will of the many straw bosses.

In times gone by he had to wander from dock gate to dock gate; more recently he has had to stand by at the dispatching hall.

Each day he worked in a more or less dangerous job, the danger being accentuated by working with different gangmates.

Now, only those who follow the beach the year 'round for a steady living in a skilled trade can get work.

Now, he has a definite job from which he can be "bumped" only for cause.

Now, he reports from home by telephone, spending his leisure time away from the waterfront.

Now, he works with the same men all of the time, thereby insuring greater safety.

From the standpoint of the employer the following benefits have resulted:

A better class of men through the careful selection of employes through the joint employment committee.

The opportunity to place before the labor group the employers' problems, thereby broadening the view of the employes and avoiding open rupture over trivial matters.

Increased efficiency with reduction in costs.

More work per man per hour than under the former system, thereby reducing ship expenses in port.

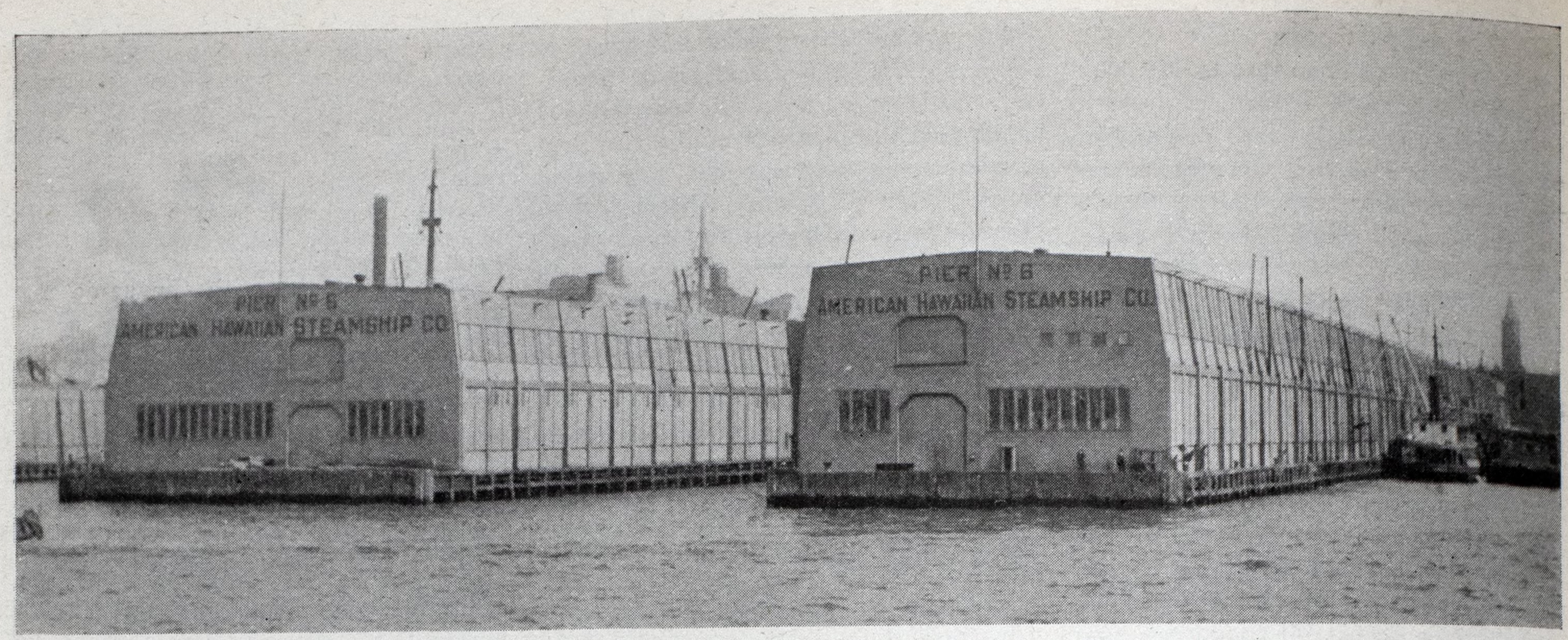
Increased safety with reduction in accidents.

Elimination of pilferage.

Harmonious and stable conditions.

The old time drifter has disappeared from the Seattle waterfront. With him has gone the agitator or radical. Longshoring is a highly respectable calling, practically decasualized now, with regular work, good wages and the minimum of inconvenience in obtaining jobs and collecting wages.

Industrial peace has been established in Seattle's waterfront industry through the common efforts of employers and employes. What began as an experiment in industrial relations seems now to have become a permanent institution.



Pier 6 of the American Hawaiian Steamship Co., Brooklyn, N. Y., Showing the Gap

Lowers Cost of Cargo Handling

Intercoastal Steamship Company Adopts Progressive Method—Use Made of Efficient Mechanical Equipment—Hand Labor Reduced to Minimum

By H. E. Stocker

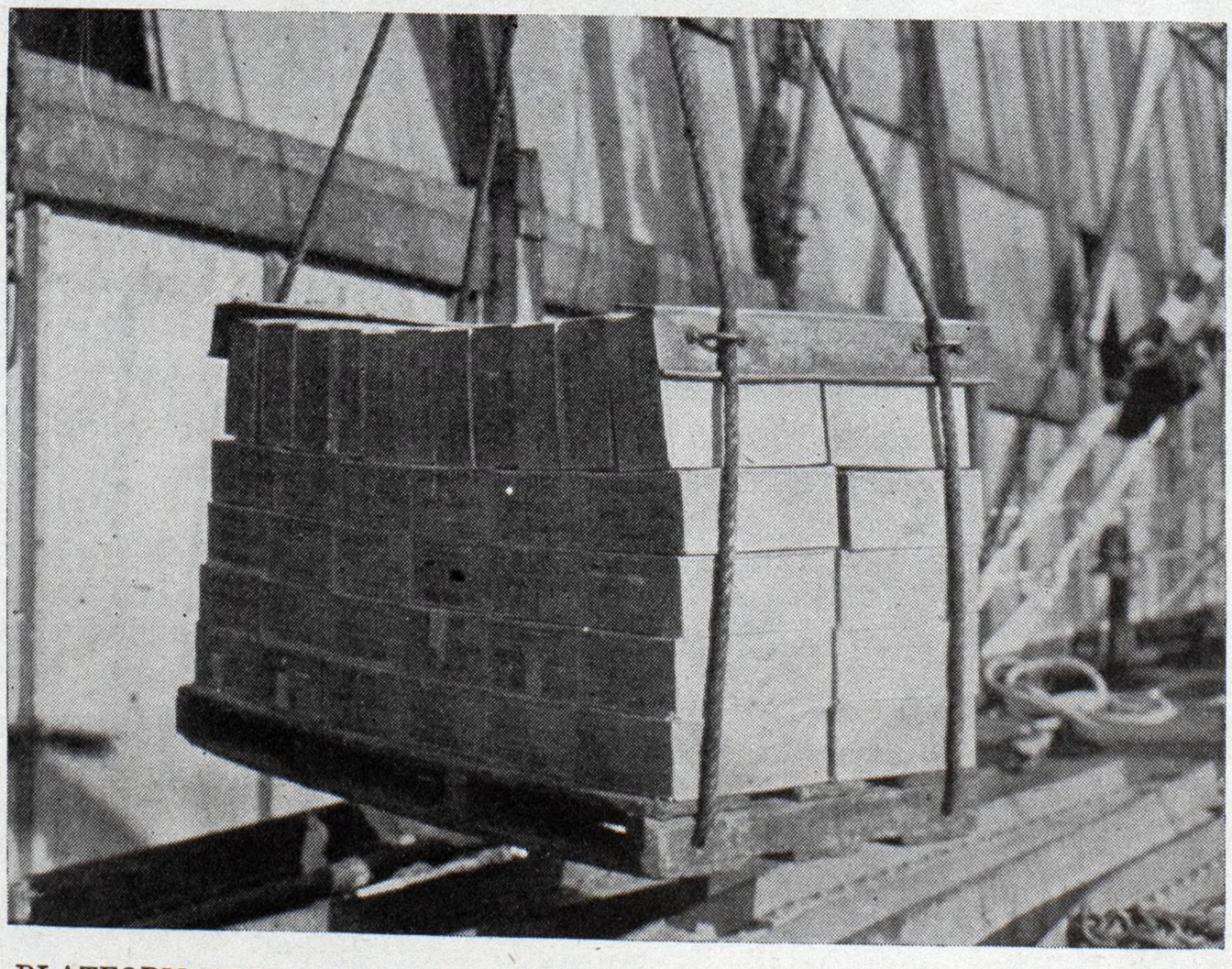
MECHANICAL equipment has been installed on the American-Hawaiian intercoastal terminal at New York to as large an extent as on any general cargo terminal in this country. The extensive use of mechanical equipment has been for the purpose of carrying out the policy of handling cargo with the minimum of damage and at a reasonable cost per ton.

The work on the terminal is divided into two operations. Loading and discharging is one operation and this is done by the stevedoring firm, the Jarko Corp. Delivery of the inward freight to street trucks and to railroad cars is the other operation. This is performed by the American - Hawaiian Steamship Co. The pier, which is double decked, is 1273 feet long and 265 feet wide. At the outer end opposite the loading berth, there is a gap or recess in the pier 88 feet by 225 feet in which lighters are berthed. This gap is shown in one of the illustrations. The roof of the pier shelters about fifteen acres of floor space for cargo. Two surface railroad tracks connected with the Bush Terminal railroad serve the pier. At the "gap" or recess in the end of the pier, the tracks separate, each running to a section on either side of the gap.

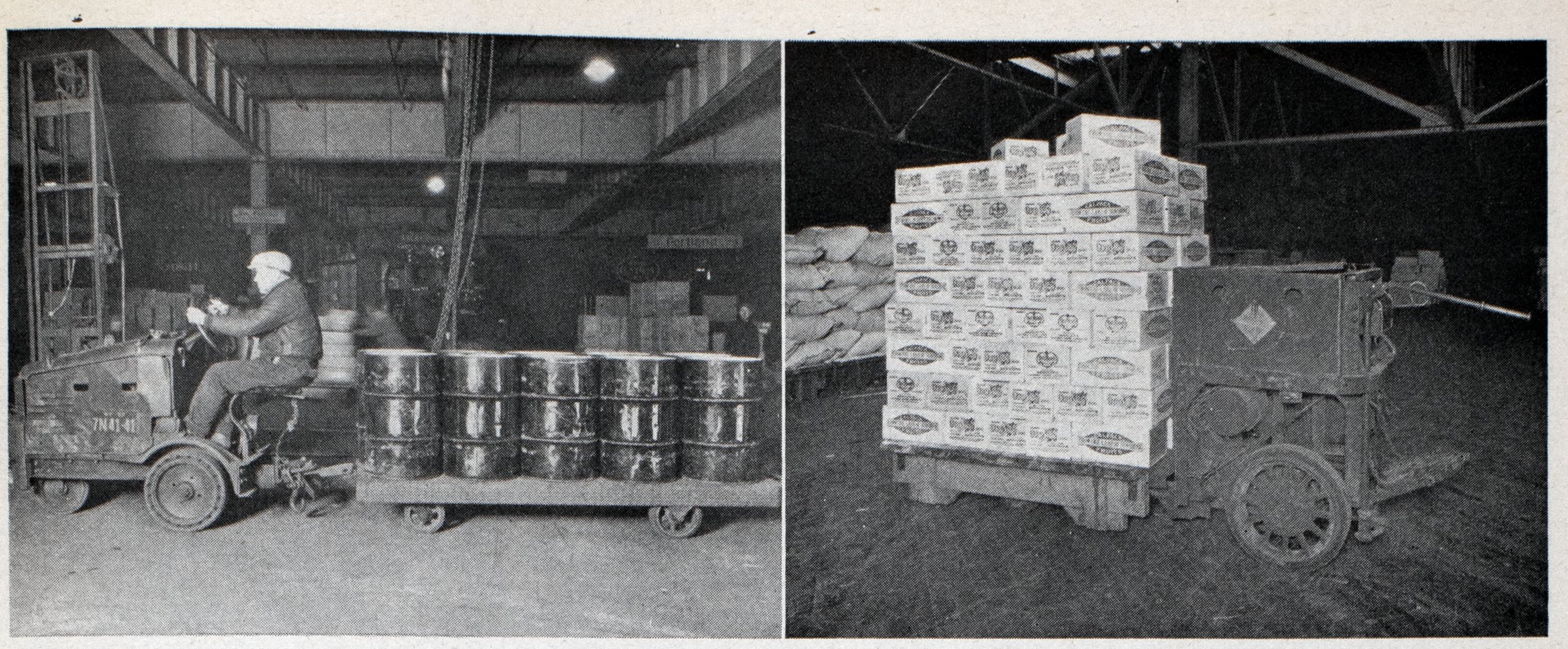
All loading is done from the lower deck of the pier. Export cargo, flour and also other inward freight which cannot be accommodated on the lower deck is discharged to the upper deck of the pier.

A total of approximately 600,000 tons of cargo is handled annually. In 1929 during a three months period, 1915 tons of cargo were received and delivered each working day. This involved the average daily movement of 300 motor and horse-drawn trucks, 20 railroad cars, 15 lighters and 15 warehouse trailers. On some days 450 trucks are loaded and unloaded.

There are two sailings and two arrivals a week. The loading and the discharging are done with eight gasoline tractors operating with a fleet of 19 steel decked roller bearing caster type trailers and 120 four-wheel trucks. Four storage battery tractors owned by the steamship company are rented to supplement the gasoline tractors owned by the stevedores. Two wheel hand trucks and dollies are also used. The gasoline tractors have an outside turning radius of 51 inches. They are of the three wheel type and are so constructed that the tractor can turn in a circle pivoted on one rear wheel. A condensing silencer is provided to insure safe operation. Ten of the nineteen trailers are three feet wide by eight feet long, while nine are three feet wide by six feet long. Both tractors and trailers are equipped with



PLATFORM SLING LOADED WITH CASES. RETAINER GUARDS AT TOP



LEFT—GASOLINE TRACTOR HAULING STEEL DECKED TRAILER. RIGHT—ELECTRIC LIFT TRUCK WITH LOADED SKID PLATFORM

rubber tires and automatic couplers. The large fleet of four-wheel trucks is provided to avoid shifting trucks from one deck of the pier to another as the cargo may necessitate. It is found more economical to have additional equipment than to pay for shifting the equipment back and forth.

The newer four-wheel trucks are of a special design worked out by the Jarka Corp. and the manufacturer. These trucks have a platform three by six feet of heavy wood construction and are fitted with roller bearings.

In loading the ships, the slingloads are made up at the pile by piling the freight on platform slings which have been placed on the trailers. When completed, the slingload is taken to shipside on the trailer, by hand if the haul is short and with a tractor if the haul is long.

Special type of gear has been built so that cargo can be handled without damage. Considering the manner in which intercoastal cargo is packed, the American-Hawaiian record of 0.88 of one per cent of freight revenue paid out in claims shows that the attention given to design of gear and the method of handling, has been effective. One of the illustrations shows a type of sling used in handling canned goods and similar packaged cargo.

Because of the frequent service and the large tonnage handled each year over the terminal, two gangs are worked in some of the hatches and in hatches of thirty feet and over as many as three gangs are worked. This has resulted in some excellent cargo handling records. One 9000-ton ship worked eleven gangs in five hatches and handled 5000 tons in 19 hours. The working of this large number of gangs is made possible by the booms which are fitted to the upper deck of the dock and by the ten electric winches which supplement the ships winches. Additional winches are rented from the Bush Terminal Co. as needed. The winches have a capacity of 5000 pounds and operate at a speed of 185 feet a minute.

The proper use of tractors and trailers was demonstrated recently on the American-Hawaiian dock in the loading of a 500-ton shipment of soda ash. The slingloads were made up at the pile of a canvas sling on the steel decked trailers. The trailers were hauled to ship's side, a distance of approximately 350 feet, by gasoline tractors. Two to three trailers were hauled at one time. At ship's side the trailers were dropped by the tractors. As a slingload was hoisted clear, the trailer was pushed out of the way by the longshoreman and a train of empty trailers made which was taken back to the pile on the return trip of the tractor. In an operation of this character, the automatic couplers with which the tractor and trailers are equipped, expedite the handling of the equipment. The soda ash was handled at an average of 40 tons an hour.

(*Continued on Page* 60)

UPPER DECK OF PIER 6 AMERICAN HAWAIIAN STEAMSHIP PIER—SKID PLATFORMS LOADED READY FOR MOVEMENT

Up and Down the Great Lakes

Protest Senate Bill—Lake Levels—Duluth Regulations—Open Salvage Office—Lake Erie-to-Ohio Waterway—Bids for Grain Elevator

ORAL arguments in the Chicago sanitary district lake-level case are scheduled for March 10 before the United States Supreme Court, Justice Van Devanter presiding. The sanitary district lost in its fight to have the arguments postponed until April from the original date of Feb. 24.

James M. Beck, special counsel for the sanitary district, in arguing for delay for further preparation of the case, contended that the sewage treatment program of the sanitary district is being carried out with "all reasonable speed," and the interests of the lake states are protected by the permit of the secretary of war, thus precluding damage resulting from an extension of time.

In a bill of exceptions filed with the United States Supreme Court on Feb. 3, the sanitary district quotes 13 objections to the report of chief Justice Charles Evans Hughes, who as special master in chancery, heard the lake diversion suit. The objections emphasize the present high lake levels as a chief argument for continued diversion of water for sewage disposal.

Protest Senate Bill

The board of directors of the Chamber of Commerce in a resolution adopted February 19 protested the inclusion of Great Lakes vessel trades in the provisions of a bill pending in the United States senate which regulates the employment and discharge of crews on board the Great Lakes vessels. The chamber of commerce committee on the American merchant marine recommended the resolution, on the ground that the passing of the bill would cause delay and hardships in the Great Lakes bulk trades. It is a provision of this proposed law that crew members must be signed on and paid off Great Lakes vessels before commissioners designated in this bill. The following quotation gives the sum and substances of the Merchant marine committee's report:

"Your committee represents and reports that the condition surrounding Lake shipping calls for fast turn arounds of lake ships at terminals; but such quick turn arounds (generally a matter of a few hours in port) are the bases of a remarkably low cost of lake transportation of grains and raw materials for industry including iron ore and coal.

"To impose conditions that would work delays or hardships to lake transportation would strike at the economical progress of the industrial and agricultural sections of the Great Lakes region and districts tributary thereto and in the absence of circumstances indicating great necessity should not be permitted."

January Lake Levels

The United States lake survey reports the monthly mean stages of the Great Lakes for the month of January as follows:

Lakes	Feet above mean sea level
Superior	602.33
Michigan-Huron	580.61
St. Clair	575.57
Erie	573.35
Ontario	246.65

Lake Superior was 0.20 foot lower than in December and it was 0.27 foot lower than the January stage of a year ago. Lakes Michigan-Huron were 0.17 foot lower than in December and they were 0.05 foot higher than the January stage of a year ago. Lake Erie was 0.58 foot higher than in December and it was 1.52 feet higher than the January stage of a year ago, 2.11 feet above the average stage of January of the last ten years. Lake Ontario was 0.20 foot higher than in December and it was 0.80 foot higher than the January stage of a year ago, 1.60 feet above the average stage of January of the last ten years.

Announcement has been made by P. J. Swartz, general manager of the Cleveland & Buffalo Transit Co., of appointment of C. E. Dempsey as general freight agent of the line with headquarters in Cleveland.

Regulations at Duluth

The secretary of war on Dec. 26, last approved a set of new rules and regulations for the canals and channels in the harbor at Duluth, and Superior, Wis. The new rules and regulations have been in force from and after Dec. 31, 1929 and they supersede the regulations for these waterways approved June 15, 1927, which are consequently revoked.

Attention is invited to the rules covering the speed of vessels and the signals for opening bridges; particularly with reference to the Duluth ship canal bridge. Vessels are not to be restricted as to speed while passing through the piers, except when work is in progress, but vessels of 200 net tons and upward shall reduce their speed while coming in through the harbor basin at the inner end of either entrance and not exceed eight miles per hour while running through any of the dredged channels of the harbor. All those interested in these rules and regulations may receive a copy by application to the district engineer at the United States Engineer office, Engineer building, Duluth. Maj. P. C. Bullard, U.S.A. is district engineer.

Rumor Rail Interest to Buy Package Line

There has been considerable rumor recently in marine circles that the Penroad Corp., has under consideration the purchase of the freight and passenger ships of the Great Lakes Transit Corp. The rumor was that the docks, boats, warehouses and office buildings of the shipping corporation in practically every major port on the Great Lakes were to be taken over by this railroad interest for the control of the tonnage of package freight on the Great Lakes. As is commonly known, the Great Lakes Transit Corp., is the largest shipping concern carrying package freight under American registry on the Great Lakes.

In addition to the package freight business the company carries on an extensive passenger trade. It is said that the Penroad Corp., began negotiations several months ago for purchasing not only the Great Lakes Transit Corp., but in addition another Great Lakes package freight line, and including the properties of the Universal Carloading Co.

However, according to executives of the Great Lakes Transit Corp., no such proposal has ever been considered by the shipping line. It is reported that such a deal would involve more than $50,000,000 and that in the Great Lakes Transit Corp. purchase alone an expenditure of between $15,000,000 and $20,000,000 would be involved.

Ports to Benefit from Lakes-to-Gulf Waterway

Contentions are made in Chicago that a number of the Great Lakes ports will enjoy broad benefits from the 9-foot waterway from Lake Michigan to the Gulf, and that when the channel is completed deliveries of various commodities should be made directly by water from New Orleans, St. Louis or any other point in the Mississippi system to any of the ports on the upper lakes.

Possibilities of the Gulf waterway tonnage available for barge movement have been the subject of much discussion. The Illinois division of waterways estimates that about 19,000,000 tons represents Chicago's available grain, coal and sand movements, both inbound and outbound. It is estimated that the switching district of LaSalle, Ill., would furnish about 1,300,000 tons incoming and outgoing cargoes, to include coal, zinc ore, sulphuric acid, sheet zinc, zinc oxide, clay and gypsum. It is figured also that tremendous shipments of cement would be made.

Word received in the Chicago district from Washington is that extensive operation of river barge lines in the Middle West within the next five years, including the Missouri river system, is likely. It is indicated that lines will be in readiness and in operation into Chicago within the next 24 months. Likewise the Missouri river lines are expected to be in operation as far as Kansas City by the spring of 1931, as far as Omaha by 1933, and Sioux City, Ia., by 1935.

Bids for Grain Elevator

It is expected that bids for 239 new cement grain cribs of the Great Northern Railway Co., at Superior are to be opened soon. This work is to be in addition to the elevator of this railroad company. The cost of the work is to involve an expenditure of $1,000,000 and will give Superior the largest single grain unit storage in the world.

Give Annual Dinner

On the evening of Feb 4, 90 members of the class of navigation and engineering conducted by the Lake Carriers association were honored by a dinner attended by federal officials of the steamboat inspection department, and members of the Welfare and Shore Captain's committee of the Lake Carriers' association at Cleveland.

George A. Marr vice president of the Lake Carriers' association, presided at this annual dinner, conducted by the association at Hotel Cleveland.

The 49th annual reunion and ball of the Marine Engineers Beneficial association of Cleveland was held Friday evening, Feb. 14, in the ballroom of the Hollenden Hotel. Owen E. Abbott was chairman of the arrangement committee. Wm. Kelly was secretary.

Opens Salvage Office

The United States Salvage Association, Inc. is now represented on the Great Lakes by Guy A. Meyers with offices in the Rockefeller Bldg., in Cleveland. The expectation is that total risks on the Great Lakes which are now $40,000,000 will become larger and on that account will warrant

—Photo by Bachrach
GUY A. MEYERS

direct representation of the American underwriters on the Great Lakes.

Mr. Meyers will act in the capacity of principal surveyor for the Great Lakes district and is to be assisted at Cleveland by William Atherholt. Mr. Meyers has been in the employ of the United States Salvage association as resident surveyor for the Texas district with offices at Galveston. Before entering the services of the United States Salvage association, he was employed for two years as port superintendent engineer for the United Gulf Steamship Co. of Galveston. Prior to that, he was in the service of the United States Shipping Board for almost six years as machinery and resident inspector.

Lake Erie-to-Ohio River Waterway Proposed

At a meeting before the board of army engineers in Washington, Feb. 4 a hearing was held regarding the feasibility of a canal from Lake Erie to the Ohio river. According to the Beaver, Mahoning and Shenango Rivers Improvement association, T. J. Bray, president, the steel and allied industries in the Mahoning valley as far as Niles, O., and in the Shenango valley as far as New Castle, Pa., could transport by water 14,000,000 tons of freight per year.

The three plans proposed in the hearing were: A route through the Mahoning river from Beaver to near Ashtabula; Toledo to Cincinnati; and Sandusky to Marietta. It is estimated that a saving of more than $5,000,000 annually would be realized in freight costs on the coal now consumed on the banks of the proposed waterways.

A total of the various commodities transported on this new waterway would include:

Coking coal	6,544,000 tons
Steam and other coal	3,041,000 tons
Limestone	4,000,000 tons
Outbound steel	200,000 tons
Inter-plant movements	14,205,000 tons

Lake Shipping Man Dies

Funeral services for Edward Taylor, for 22 years a shipbuilder and resident of River Rouge, were conducted Jan. 9 at River Rouge, Mich. Born in Dumbartonshire, Scotland, Taylor came to this country and settled in Cleveland 40 years ago and was a shipbuilder in that city for nearly 20 years, at which time he became associated with the American Ship Building Co., at River Rouge. Two years ago he retired. During the great war he was responsible for organizing the yards of the Saginaw Shipbuilding Co., Saginaw. He received the commendation of the United States shipping board for this work.

Mr. Taylor was a member of the River Rouge Masonic lodge and is survived by his widow, Theresa Cook Taylor, three sons and two daughters.

Is Elected President

At the annual shipmasters meeting at Mount Clemens, Mich., Jan. 31, Capt. Milton J. Brown, who was former president of the Cleveland lodge No. 4 was chosen first vice president. Captain Brown, who is master of the steamer Presque Isle, of the Cleveland-Cliffs Iron Co., was formerly grand marshal of the grand lodge and is in direct line for becoming its president.

Peter Cartwright of Milwaukee was re-elected president for another year.

Personal Sketches of Marine Men

Charles M. Reagle, Vice President, Cooper-Bessemer Corp.

By Theodore K. Cook

EXPERIENCE afloat and an engineering training give him background for sales work, and an appreciation of practical limitations.

SUITABILITY of a prime mover in any particular case has been his unalterable policy. No sale can long be satisfactory unless this is so.

GOOD design and workmanship combined with a fair sales policy are responsible for the expansion of the business under his direction.

CHARLES M. REAGLE, vice president of the Cooper-Bessemer Corp., in charge of diesel engine sales, has a first-hand knowledge of the sea, of men who go to sea, and of ships and their machinery and equipment. When the United States entered the world war he was called to service by the United States navy and commissioned as ensign. He served during the war as commander of the "70" and in convoy duty on board the U. S. S. EMERALD. This practical experience at sea has been of great value to him in his work of studying the suitability, from an engineering point of view, of the use of the diesel engine. It makes his outlook upon this question sane and reasonable as he understands the characteristics of other types of power.

After the customary high school and college training, Mr. Reagle spent his first year and one-half in the engineering department of the Midvale Steel Co. It was while engaged in this capacity that he answered the call to service afloat. At the end of the war he resigned from the navy to take the position of assistant sales manager of the Bessemer Motor Truck Co. He continued in this work for some time and demonstrated those qualities of personality and mind which help in the successful handling of any situation. Leaving this position he took over the sale and distribution of Hudson, Essex and Lincoln automobiles at Colorado Springs, Colo. Five active years were spent in this work, selling and servicing automobiles and in the meantime building up one of the largest agencies in the west.

In 1923 Mr. Reagle gave up his automobile business to join the Bessemer Gas Engine Co., in charge of diesel engine sales. During the past six years he has been actively engaged in the sale of diesel engines, both for marine and stationary purposes, built by this company and now by the combined Cooper-Bessemer Corp.

It is fair to say that the good reputation held by the present Cooper-Bessemer diesel engine is due in part to the close co-operation in which he has worked with the engineering department as well as the intelligent and efficient manner in which he has supervised all marine and industrial sales. A number of Mr. Reagle's ideas of design and construction, based on practical knowledge acquired through years of contact with the application of diesel power to various types of duty, are incorporated in the diesel engines now turned out by his company.

One of the important sales policies he has followed with tenacity is the insistence in each individual case that an unbiased engineering study must show the suitability of the diesel engine in that particular application. As an honest engineer he realizes that there are places where the diesel engine should not be used as well as that there are places where this type of power is the only suitable prime mover.

During his six years with the Cooper-Bessemer Corp., in charge of diesel engine sales, the production and sale of diesel engines has grown from small beginnings to the point where this company is now one of the largest builders of this type of engine in the country. A share of the credit for this performance is undeniably due to the vice president, in charge of diesel engine sales, Charles M. Reagle.

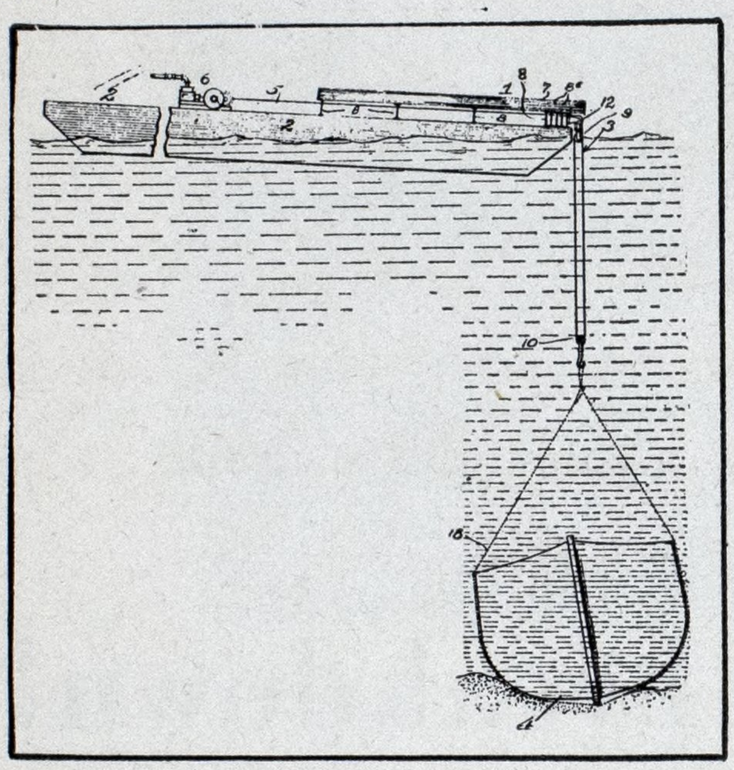
Patents Show Marine Development

Latest Marine Inventions Described

Specially Prepared for Marine Review
By Richards and Geier

Patent Attorneys, 274 Madison Avenue, New York

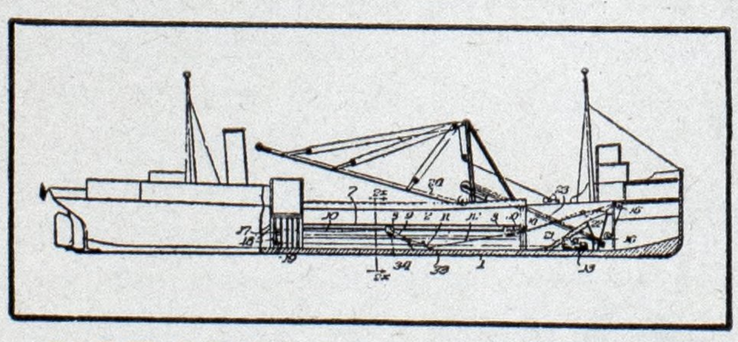
THIS invention relates to means for raising sunken or wrecked vessels, the object of the invention being to provide an apparatus simple in construction, efficient in operation, and of a form which will adapt it to be readily applied as a unit to existing scows, barges, or like buoyant vessels to be operated over the sunken vessel, or to be built in as a permanent part of the screw or like vessel.



APPARATUS FOR RAISING SUNKEN VESSELS

United States patent No. 1,741,681, issued Dec. 31, 1929, to Walter N. Davis, of Staten Island, N. Y.

AN OBJECT of the invention is a self-unloading vessel provided with a subcargo unloading tunnel, with a scraper adapted to traverse said tunnel and remove material therefrom, and with a side incline directing the flow of material into the path of the scraper; said tunnel being constructed with a trough-like bottom in which the scraper approximately fits, transversely, and providing a drop-off between the lower extremity of the incline and the said bottom; the said tunnel materially increasing in width above the said trough-like bottom.

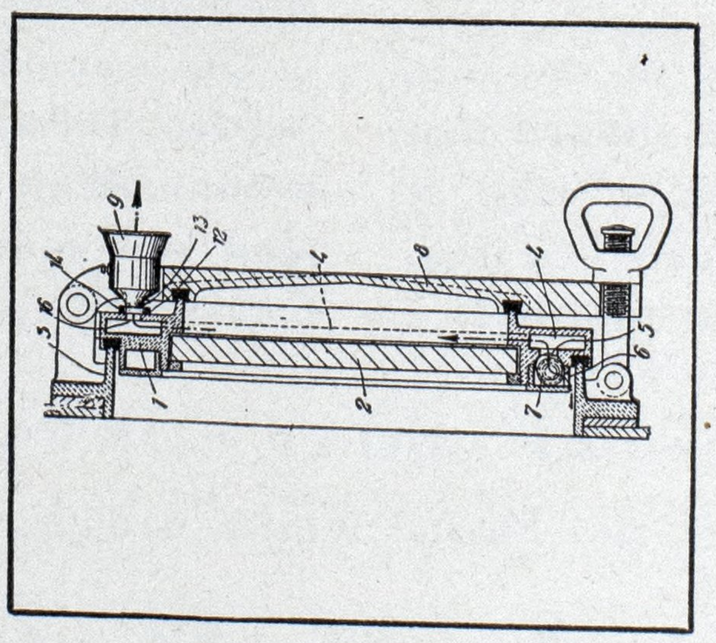


SELF-UNLOADING APPARATUS FOR CARGO CARRIERS

United States patent No. 1,741,167, issued Dec. 31, 1929, to Leathem D. Smith, of Sturgeon Bay, Wis.

IT HAS already been proposed to provide the port holes of ships with air passages in the framework of the port hole, so that fresh air can enter the interior of the ship from without, even when the porthole is closed. Such an arrangement has, however, only a certain amount of effect when the wind is at right angles to the direction in which the ship is traveling and on the weather side of the ship, while on the lee side the effect is very slight, more particularly as the air in traveling through the air passages in the port holes has its direction altered several times, and other resistances interfere with the free passage of the air.

The invention overcomes these drawbacks and allows of an effective ventilation of the interior of the ship on the lee side as well as at other places which are not exposed to wind pressure.

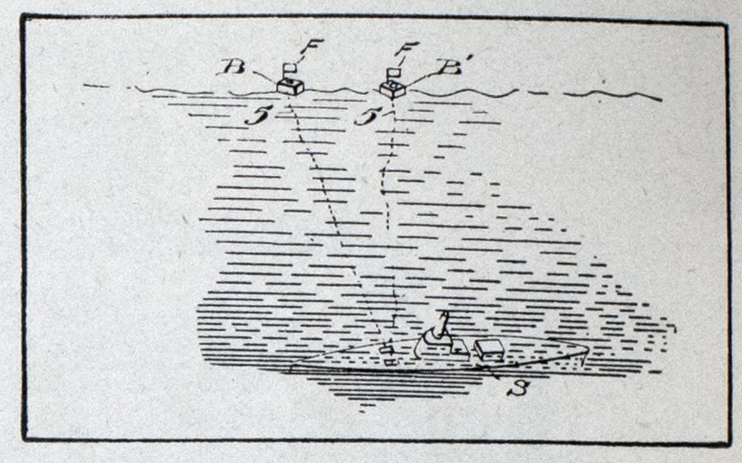


PORTHOLE FOR SHIPS

United States patent No. 1,744,806, issued Jan. 28, 1930, to Luder Schriever, of Danzig-Lanfuhr, Free State of Danzig, and Alfred Michael, of Bremen, Germany.

BY THE utilization of the equipment of this invention, a sinking vessel or dangerously submerged one, may with facility and reliability display the distress signals for a rescue ship, and the latter may with safety and surety proceed to save the lives of the crew as well as the ship.

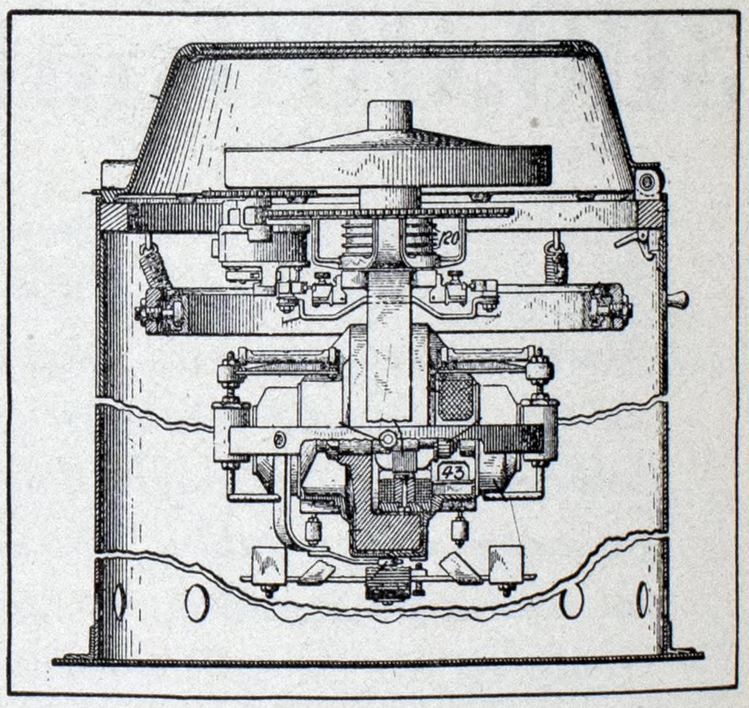
WE HAVE made arrangements with the patent attorneys, Richards & Geier to publish data relating to letters patent issued in the United States covering inventions which may be of particular interest to our readers. The patents described, some of which have accompanying cuts partially illustrating the inventions, are all of recent date and we are planning, in subsequent issues, to publish similar information on patents pertaining to various phases of marine development work. Should our readers be interested in obtaining a printed copy of any of the patents appearing in this issue, or any other patent desired, such copies may be had by addressing request to the editor or direct to the contributors of this page.



LIFE AND VESSEL SAVING EQUIPMENT

United States patent No. 1,742,687, issued Jan. 7, 1930, to Thomas J. Burke, of New Orleans.

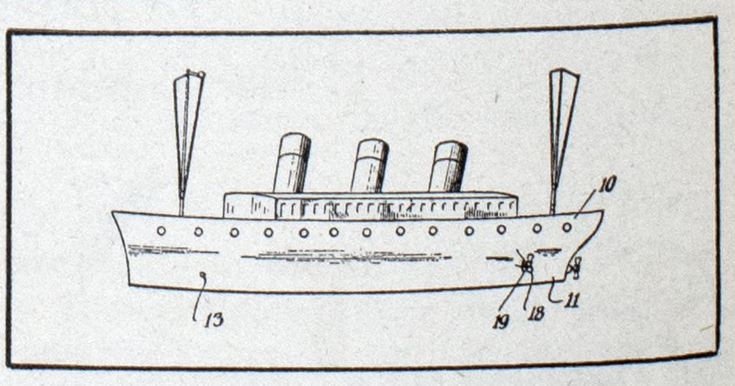
THIS invention relates to gyroscopic compasses, one of the principal objects being to render possible the utilization of direct current for the driving of the gyro rotor instead of alternating current as has heretofore been universally employed.



DIRECT-CURRENT GYROCOMPASS

United States patent No. 1,728,185. Issued Sept. 17, 1929 to Charles B. Mills, of Brooklyn, New York.

THIS invention relates generally to a means for receiving and determining the direction of submarine sounds, and more particularly to a receiving unit used therein and its installation.



APPARATUS FOR RECEIVING AND DETERMINING THE DIRECTION OF SUBMARINE SOUNDS

United States patent No. 1,742,704, issue Jan. 7, 1930, to Harvey C. Hayes, of Washington.

Build Fifty-Two Ships in Five-Year Program

According to estimates by the United States shipping board the shipbuilding program of the nation for the next five years involves construction of 52 vessels of a gross tonnage of 604,500 and an approximate cost of $235,000,000. These vessels are to be built under the terms of the merchant Marine Act of 1928 based on the Jones-White bill. Loans are to be granted by the government at a low rate of interest and the vessels are to be built in conformance with government standards. According to the Merchant Marine bulletin the vessels built, building and proposed under provision of this act are as follows:

Name of line	No. of Vessels	Gross Tonnage
American Export Line	8	65,600
Panama Pacific Line	1	22,000
American South African Line	2	17,000
Dollar Line	4	92,000
Grace Line	6	50,000
Motor Tankship Corp.	5	60,000
Matson Line	2	20,000
Ward Line	2	22,600
United States Lines	4	130,000
Roosevelt Line	4	48,000
United Fruit Line	8	47,500
Colombian Line	2	10,000
Mississippi Shipping Co.	2	9,800
Lykes Bros.-Rippley Co.	2	10,000

As a result of the merchant marine act of 1928 contracts have been awarded for the building of 17 new vessels, totaling nearly $70,000,000. Plans will be underway shortly for the building of additional ships as required under the mail contracts to be awarded, making a total of about 52 ships valued at approximately $235,000,000, most of which will be built within five years. These vessels are to be the most modern types and comparable to any in the world.

Order Two New Barges

Contract for the construction of two steel sand and gravel barges for service on the Ohio River was made recently by the Nugent Sand Co. of Louisville with the Howard Shipyards and Gulf company of Jeffersonville, Ind. The new barges are to be each 110 feet long, 28 feet beam and 7 feet 4 inches deep. The steamers TITAN and WILLIAM LORIMER JONES now under construction in the Howard yards are to be equipped with Foster Wheeler steam generators instead of the usual type boilers. Each generator consists of a water tube boiler and economizer with radiant heat superheater. Each unit is to operate at 300 pound pressure, generating from 15,000 to 20,000 pounds of steam per hour and 100 to 125 degrees of super heat. The generators are to be fired by automatic stokers and will deliver an efficiency of about 80 per cent. These generators are the first of their type to be installed on tow boats for service in and around Pittsburgh.

New Tankers Ordered

Contract has been awarded the Sun Shipbuilding & Dry Dock Corp. by the Standard Oil Co. of New York for construction of two 13,450 deadweight ton bulk oil carriers. The ships are to be 480 feet long, 65 feet 9 inches beam and 37 feet molded depth.

Elected Vice President

Succeeding Frederick P. Palen, recently resigned, Captain Roger Williams has been appointed vice president of the Newport News Shipbuilding & Dry Dock Co., in charge of the New York office.

Captain Williams has served for the past ten years as manager of the operating department of the International Mercantile Marine Co., and his contact during the past three years has been particularly close with the Newport News yard in the building program of the Panama Pacific liners CALIFORNIA, VIRGINIA and PENNSYLVANIA. He is a graduate of the United States Naval Academy in the class of 1901 and continued in the naval service as an officer of the line until Feb. 1, 1920. He resigned at that time to take up his work as operating manager of the International Mercantile Marine Co.

For Increasing Safety

A. J Passage, general contact representative of Associated Industries of New York State center, presenting award for no-accident record to French Line pier officials. Thomas Wolfe, marine superintendent right and Charles Spielman, pier superintendent, left.

Mail Contracts Call for Forty New Vessels

According to report of the department of commerce, inauguration of 12 new ocean mail routes and two changes in routes already in operation is being announced by the post office department. A total of $175,000,000 will be involved in the program of shipbuilding in this program carried out over a period of ten years.

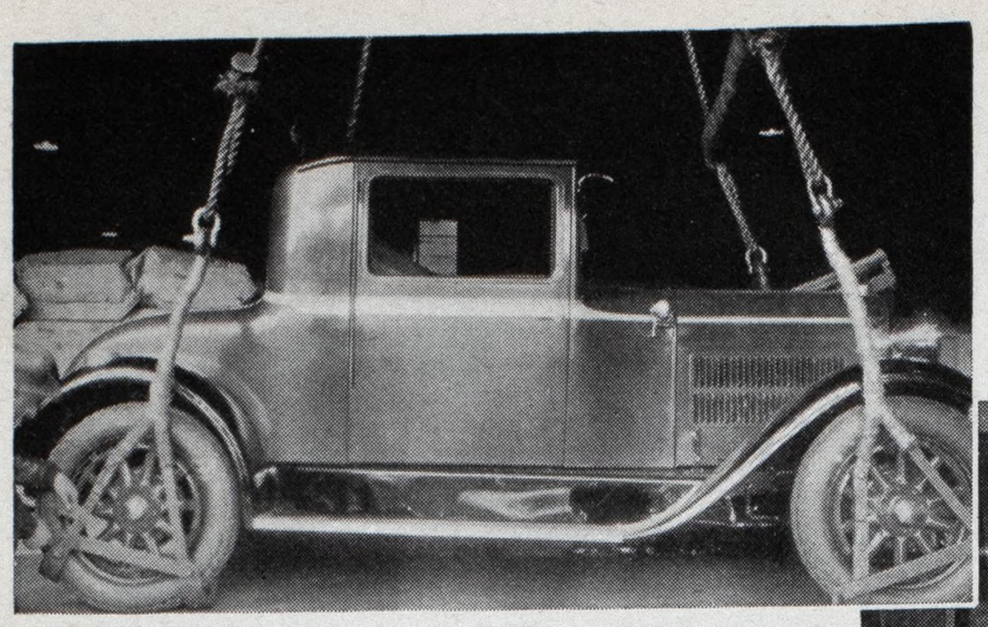
Building contracts already awarded in this program total $253,000,000 involved in shipbuilding required under mail contracts. An expenditure of $78,446,000 is involved in contracts for construction, or substitution or betterment which have already been let for the 25 ocean mail routes in operation. A total of 40 new vessels are to be constructed or substituted for the 12 new routes recently advertised. The estimated cost of the vessels is $174,800,000. A total mail pay of $9,000,000 per annum is the estimate that has been made on the mail contracts just advertised. The pay on the 12 new routes for the first year is to be approximately $7,100,000. For extended service on other routes approximately $1,200,000 is to be paid, making a total of approximately $8,300,000.

Five Ships Sold

Sale of five steel cargo steamers to Johann G. Ohsol, New York for $287,000 cash with the privilege of transferring the vessels to foreign registry was authorized by the shipping board on Feb. 12.

Three of the vessels, the steamers EASTERN CROSS, EASTERN CHIEF and EASTPORT are cargo vessels of 6800 deadweight tons and it is stipulated that they will not be operated to or from ports of the United States for a period of ten years. The other two, the steamers LAKE FITCH and LAKE FERRONA are small vessels of 4155 deadweight tons.

The picture on the 1930 Columbian Rope calendar, "Sunrise on the Grand Banks," shows a scene that was common 20 or 30 years ago but which will probably never be seen again. A big American sailing ship is slowly overhauling a fishing schooner. On the square rigger the watch are setting the fore and mizzen royals and the flying jib while on the deck of the Gloucester fisherman some of the men are gathered to comment on the stranger overtaking their vessel. The painting is by Charles Robert Patterson whose appreciation of the square rigged sailing ship is well portrayed.



SPECIAL QUICK ATTACHING AUTO HANDLING GEAR

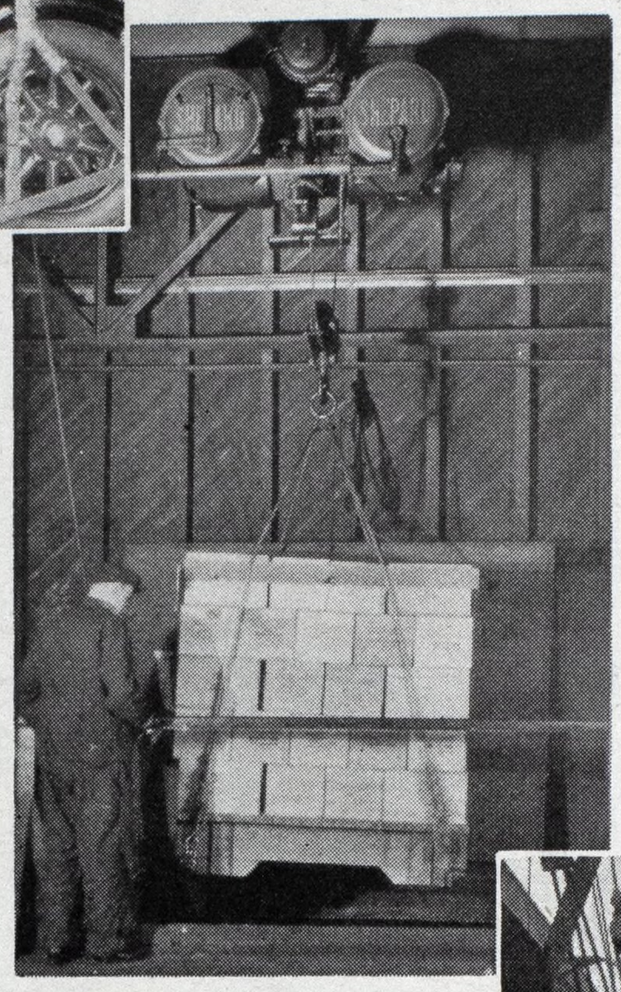
Lowers Handling Cost

(*Continued from Page* 51)

The American-Hawaiian provides a large trailer with crate like side for receiving small shipments from street trucks. This keeps a large number of trucks off the pier and reduces congestion. These trailers are hauled by electric tractors to the place on the dock designated for the cargo.

Cargo discharged to the lower deck is loaded on trailers or four-wheel trucks and hauled to place of rest on the pier by hand or tractor, depending on the length of haul. On the upper deck, the canned goods and dried fruit are loaded on trucks and hauled by hand to a sorting area which is surrounded by enough skid platforms to take care of the various marks. There the truck is hauled to the proper skid and the cases transferred. When the skids are fully loaded, they are taken to a designated section of the pier by electric lift trucks.

Flour and beans are loaded on a staging and are "humped" to the skids placed by the staging. Five thousand five hundred skids are used on the upper deck of the dock. These are forty inches by sixty inches, have an underneath clearance of eleven inches and a distance between legs of 26 inches. The skids are handled by storage battery lift trucks equipped with lead batteries. Ownership of these trucks is divided between the American - Hawaiian and the Jarka Corp.



ELECTRIC HOIST USED FOR LOWERING SKIDS TO TRUCKS

The trucks are supplemented by fifteen hand lift trucks which are used for short hauls. Spare batteries are provided. A charging panel is used for charging the batteries.

In the fall, when the inward tonnage is the heaviest, tiering is necessary. This is accomplished in the case of hay and some other commodities by rigging a block and tackle to the beams of the upper deck of the pier. The tackle is operated with one of the tractors.

Deliveries from the upper deck are made to lighters and to street trucks. The lighters are loaded by the stevedores. The lift trucks carry the skids to the doorway, where a bridle type of sling of special design is attached. This sling has two pieces of bar or angle iron which are placed under the skid legs or runners. An electric dock winch, working with a boom on the dock, lowers the skid to the lighter. To save the men carrying packages a long distance, an electrical lift truck is lowered to the lighter for use in carrying the skids to the pile.

Delivery to the street trucks from the upper deck is handled by the American-Hawaiian. The loaded skids are carried to the head of the pier and are placed under a three-ton capacity electric hoist. A bridle is used of the same design used in lowering skids to lighters. When the load is lifted clear, the hoist moves over a hatchway in the floor of the dock and lowers the skid to a platform at which the street trucks are placed for loading. There are 10 hatchways served by four electric hoists. The pier is provided with several chutes from the upper deck but these are used only to supplement the system described above because the above system is more effective than the chute system.

SIDE OF PIER SHOWING BOOMS ON UPPER DECK

Unnecessary handling is avoided by handling the cargo on skids. The cargo is delivered not only in good condition but at a reasonable cost to the steamship company.

Novel Rivetless Tanker Launched

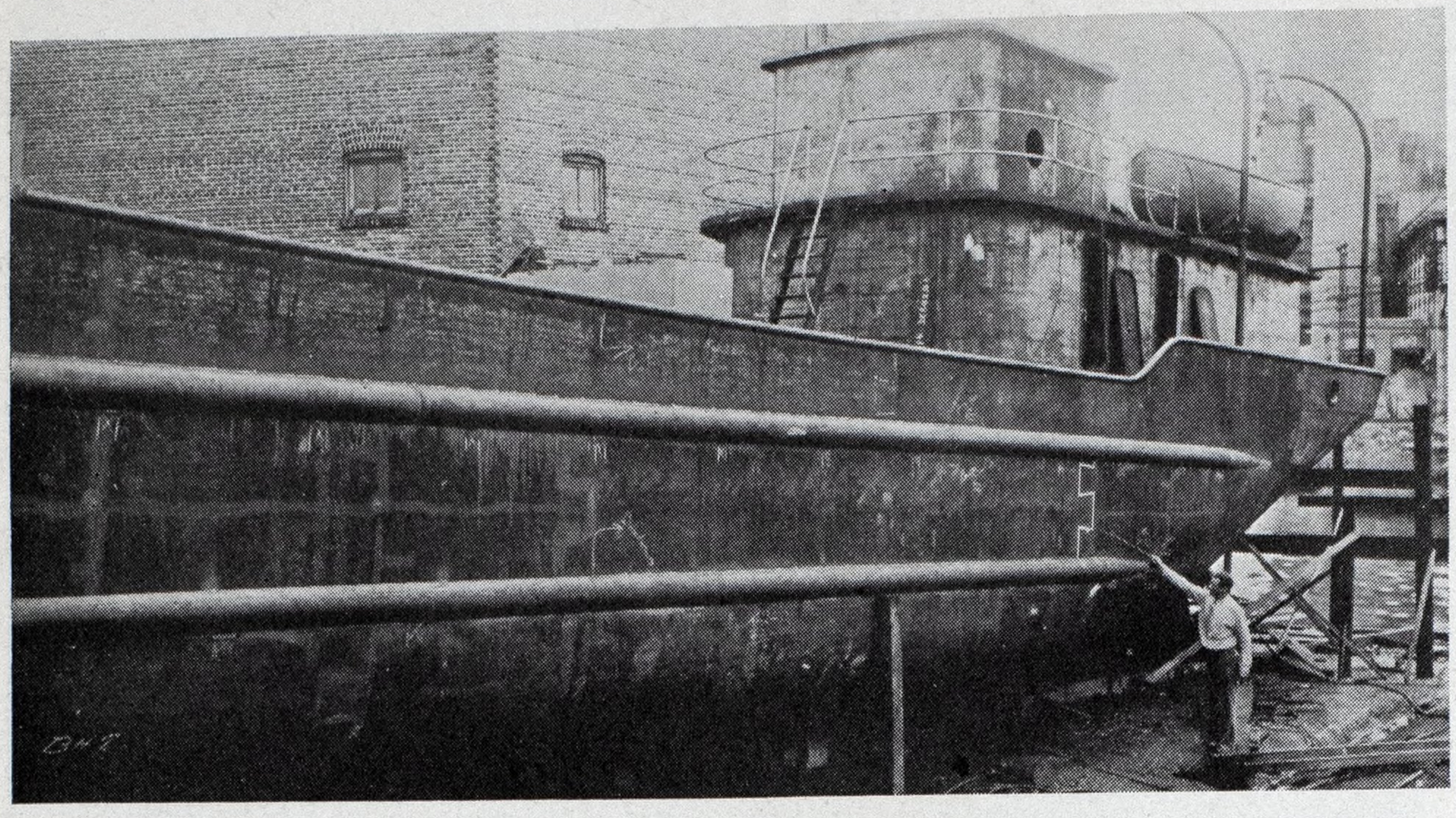
THE first rivetless cargo vessel, a 2500-barrel oil tanker, has just been completed in the yards of the Charleston Dry Dock & Machine Co., Charleston, S. C., and was launched Feb. 14. Her service test will take place about Feb. 28, after which the tanker will go into service for the Texas Oil Co.

This vessel was constructed entirely by the arc-welding method and has not a rivet, bolt or structural angle anywhere in its structure. The arc welding was done under a new system of dove-tailed, lock-notched plates, developed by Richard F. Smith, a young ship designer and inventor. One acetylene cutting torch and one General Electric arc welding machine were employed. Only nine workmen were required and 8000 pounds of welding wire were used as compared to 85,000 pounds of rivets which would have been necessary had the construction been by the riveting method.

The preliminary estimate of Mr. Smith was that a saving of 20 per cent in weight and of 25 per cent in the cost of construction would be realized, as compared to riveted vessels. These figures were verified in the actual work, and in addition the vessel was found to have greater cargo capacity because of the absence of rivets, bolts and angles. The ship is 120 feet long and 23 feet wide, and has a 10-foot draft. The United States navy department as well as a

shipbuilding corporation, a railroad company and foreign shipbuilders have inspected the vessel.

Previously there have been riveted less scows and a rivetless yacht, as well as several vessels combining both riveting and welding, but never before a completely welded ocean-going cargo carrier.



AN ALL-WELDED TANKER BUILT AT CHARLESTON DRY DOCK AND MACHINE CO.

Seek to Amend Bill

The Merchants' association of New York, through its executive committee, has voted to seek the amendment of a bill introduced in congress by Representative Free of California which is intended to bring about a lower interest rate on government loans to operators of American vessels in foreign trade during the period when such vessels are being constructed, equipped or else remodeled.

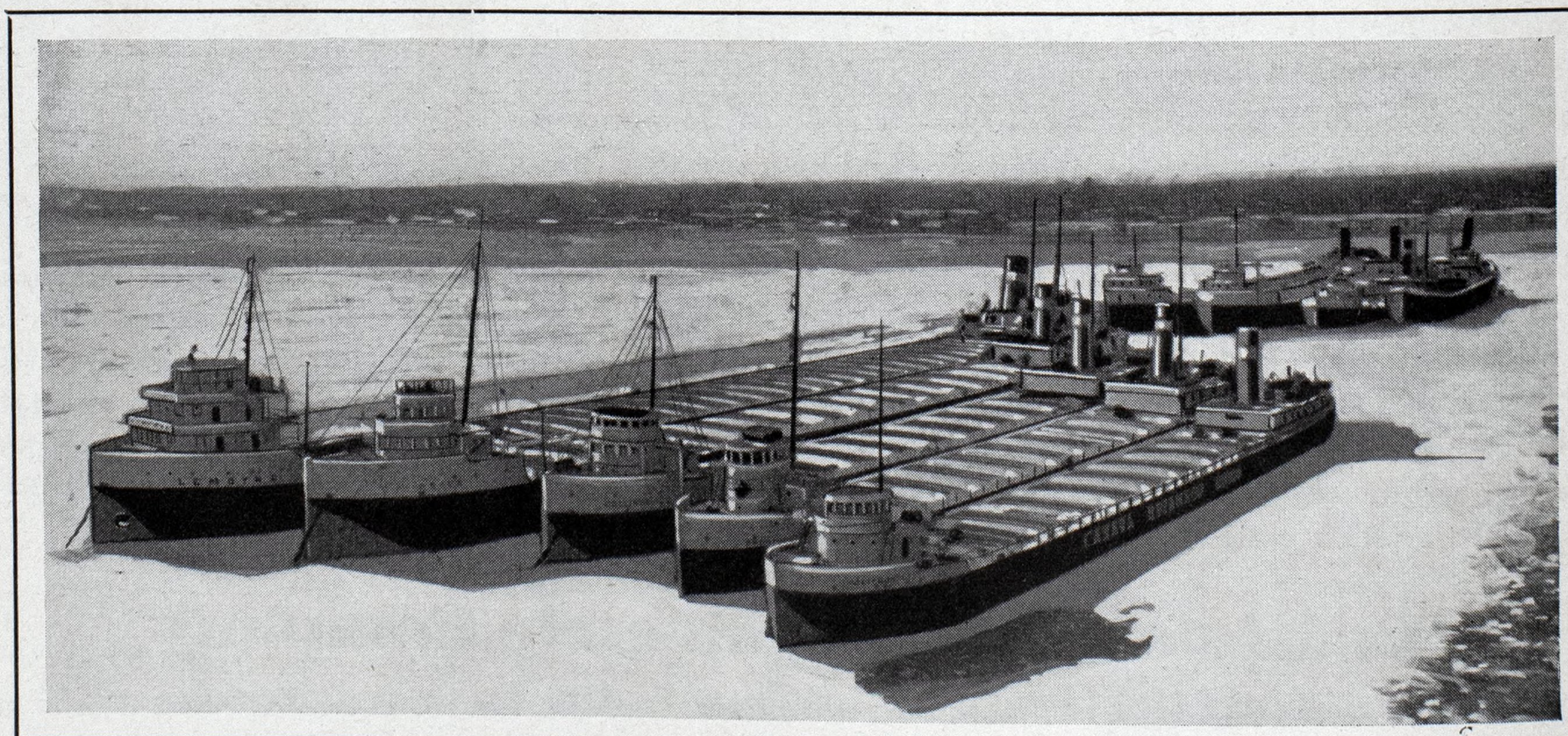
Under the current law all such loans to operators bear interest at the rate of 5¼ per cent per annum. The Free bill provides that the interest rate during the period when the vessel for foreign trade is being constructed, reconditioned, equipped, remodeled or improved, shall be at the lowest rate of yield of any government obligation bearing a date of issue subsequent to April 6, 1917, and outstanding at the time the loan is made.

The bill was studied by the Merchants' association's maritime committee, of which M. A. Kerwin, vice president of the Di Giorgio Fruit Corp., is chairman. This committee expressed itself as heartily in favor of the principles which the bill seeks to establish. The executive committee, of which Willis H. Booth is chairman, made a further study of the proposition and decided that while the purpose of the measure was a desirable one there should be certain changes made in the language in the interest of clarity. The amendments that have been proposed to the Free bill by the association are the following:

1. That in the terms describing the period in which a vessel for foreign trade shall enjoy the lower rate of interest the word "improved" should be eliminated. It was the judgment of the committee that the purpose of the bill was to apply such lower rate of interest during the period the ship is actually withdrawn from operation and that "improved" might very likely include changes or alterations being made while the ship is actually in remunerative service.

2. That the rate of interest on any government obligation issued subsequent to April 6, 1917, and outstanding at the time of the loan is, in the judgment of the executive committee, not the basis by which to determine the amount of interest to be charged, but that the appropriate basis would be the lowest interest on current government obligations.

Otto A. Banner, formerly chief engineer of the diesel division of the Falk Corp. has been retained by Busch-Sulzer Bros. Diesel Engine Co., St. Louis, to act exclusively for the latter company as consultant in matters relating to diesel engines and diesel geared drives.



Winter Storage Grain at Sarnia, Ont.—Lake Freighters of Canada Steamship Lines with 2,490,000 Bushels of Grain Waiting for Spring. S. S. Lemoyne, Osler, Collingwood, Brentwood, Portsmouth, Westmount, Donnacona, and Renfrew

Motorship Amerika

(*Continued from Page* 30)

supplying the current for operating the auxiliary machinery for lighting purposes, fans, wireless, etc.

Special precautions have been taken to eliminate vibrations from the hull, and the diesel generators as well as the main propelling engine have been fully balanced.

There are two sets of main cooling water pumps of the centrifugal type, each direct coupled to an electric motor, to give sufficient cooling water for main and auxiliary engines. The pumps are amply dimensioned so that only one will be needed, one acting as stand-by.

In addition a separate electric motor driven cooling water pump for the auxiliary engines is fitted for use in port.

The lubricating oil pumps are of the Burmeister & Wain special design rotary type, driven by electric motors, each designed for a capacity of about 200 tons per hour. To cool the lubricating oil, there is one 150 square meter cooler of the condenser type. An oil separator is fitted in the lubricating oil circuit, driven by an electric motor.

The oil fuel supply pump has a capacity of 50 cubic meters per hour and is driven by an electric motor. The ballast pump is a rotary pump coupled to an electric motor and the capacity is 150 tons of water per hour.

Pumps are installed for bilge and sanitary purposes consisting of two bilge and one sanitary pump of the single acting plunger type.

In the engine room a cross tube boiler is installed for heating and auxiliary use, with a heating surface of about 120 square feet. It is designed for 80 pounds working pressure. Oil firing is fitted.

For starting and maneuvering of the main engine there are two two-stage compressors of the Burmeister & Wain type, each compressor being operated by an electromotor.

Seek Uniform Load Rules

THE British government has issued invitations to the governments of all maritime nations to attend a conference on load lines to be opened in London on May 20. In all probability the report of the load line committee of the British board of trade on merchant vessels, timber carriers and tankers, published last September, will be used as the basis of discussion. One of the objectives of the conference is an agreement on one set of load line rules to govern all vessels in international trades, thus eliminating the many confusing regulations vessels now encounter in entering foreign ports.

The American tanker technical committee has drawn up tentative load line regulations which it will present at an informal conference of shipowners to be held in London on March 17, at which time also load lines for lumber carriers in the Baltic and transpacific trades will be discussed. The informal conference of March 17 is intended to clear the way for the international meeting which is to be held on May 20.

Owing to the fact that American operators have had more experience with tankers than any other nation, recommendations of the American committee on tanker load lines are expected to carry considerable weight. American tankers at present number approximately 365 vessels, with several additional ships under construction. It is contended that they may be loaded much lower than vessels of other types, owing to their peculiar construction, provided the subdivision and strength of bulkheads conforms to classification society rules.

The load line law passed by congress in March, 1929, and which becomes effective on Sept. 1, 1930, applies only to vessels engaged in foreign trade. The department of commerce, in conformity with the provisions of that act, drafted load line regulations to be applied to vessels in the coastwise, intercoastal and Great Lakes trades, and these will soon be brought up for discussion in both houses of congress to determine their fitness.

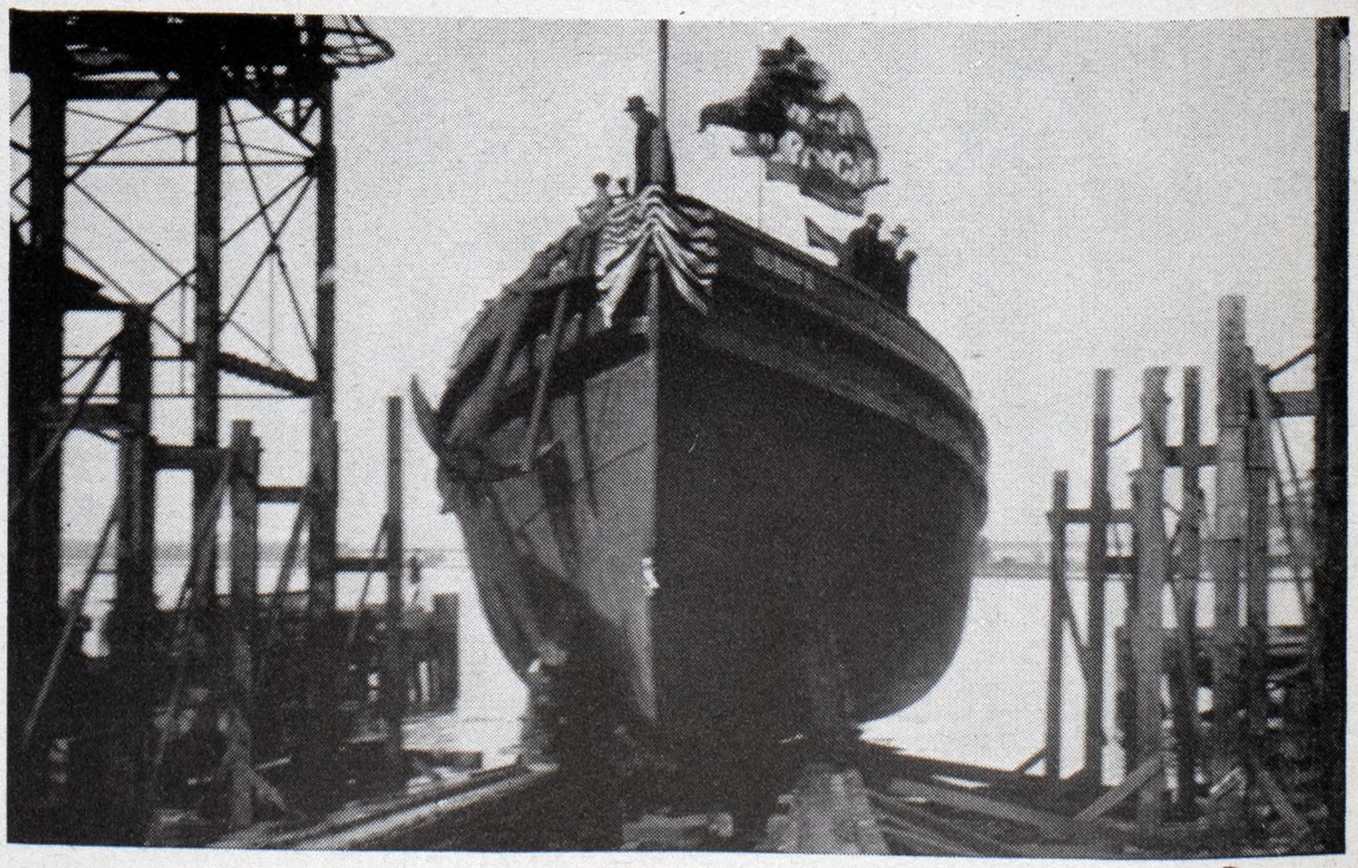
Members of the American tankers' technical committee who will attend the London conference are H. B. Walker, president of the American Steamship Owners' association; James Kennedy, general manager, marine department, Gulf Refining Co.; Robert F. Hand, vice president and assistant general manager, Standard Shipping Co., and Sir Joseph Isherwood.

Tug Launched at Staten Island Shipyard

THE tug boat DU BOIS II, the seven hundred and ninety-second hull built at the Staten Island plant of United Dry Docks, Inc., New York, was launched Feb. 8. The tug, which is being built for the Henry Du Bois Sons Co., dredging contractors, will be delivered in March.

Designed for harbor and coastwise towing, this vessel is 128 feet long, 27 feet wide and 14 feet deep. She is an oil burner, powered with a triple expansion steam engine. The keel was laid in October, 1929.

The Staten Island plant of the United Dry Docks Inc. now has on the ways a ferryboat for the city of New York, two tugs for the Baltimore and Ohio railroad and a diesel powered lighter for the New York Central railroad. The ferryboat, a duplicate of the recently built DONGAN HILLS, will be launched in August.



Late Flashes on Marine Disasters

Brief Summaries of Recent Maritime Casualties— A Record of Collisions, Wrecks, Fires and Losses

Name	Date	Nature	Place	Damage Resulting
Annie E. Conrad	July 18	Not stated	Ireland Eye Island	Total loss
Ambrose	July 26	Struck sbmgd wrk	Not stated	Propeller
Algeria	July 3	Sank	Liverpool	
Aurora	July 5	Ashore	Hayle	Leaking
Alma	July 11	Stranded	Oland	Floated
August Schultze	July 9	Stranded	Oporto	Floated
Arclight	July 11	Collided pier	London	Not stated
Austral	July 12	Collision	Off Trevose Head	Damaged
Atxeri Mendi	July 31	Collision	Rosario	Damaged
Almelo	July 22	Ashore	Molleplaat	Floated
Avarua	July 21	Fire	Raiatea	Sank
Altmark	July 22	Heavy weather	Magallanes	Starboard Windlass
Anandale	Aug. 6	Collision	Weehawken	Jib boom
Agiwidale	Aug. 6	Collision	Philadelphia	Not stated
Biboco	July 15	Disabled	Para	Lost propeller
Bothnia	July 10	Struck Quay wall	Swansea	Stem; starboard side
Brika	July 18	Aground	Hook of Holland	Floated
Bertil	July 21	Collision	Antwerp	Above waterline
Burdale	July 24	Collision	Rosario	Plates
"B"	July 29	Aground	River Mersey	Floated
Betty Alden	Aug. 11	Ashore	Rainsford Island	Floated
Capillo	July 18	Aground	London	Floated
Colombo	July 26	Ashore	Cartagena Bay	Floated
Capitaine Bonelli	July 3	Fire	Newport, London	Not stated
Consul Cords	July 3	Collision	Danzig	Starbd. side
Cambrian Idylle	July 8	Aground	Rosario	Floated
Caledonian Monarch	July 12	Collision	Off Trevose Head	Stem; forepeak
Christina	July 12	Collision	Lat. 50:22	Not stated
Conde De Churruca	July 26	Disabled	Quarantine	Engine
C. H. Houston	July 28	Collision	St. Lawrence	Damaged
Cecil County	Aug. 7	Struck pier	Staten Island	Starboard quarter
Cairnhill	July 31	Collision	Rosario	Damaged
City of Candia	July 31	Disabled	Southampton	Steering gear
Cap d'Antifer	July 21	Collision	Antwerp	Starbd. side
Derfflinger	July 17	Struck rock	Nr. Tsingtao	Forward—floated
Dimitrios M. Diacakis	July 10	Aground	Buenos Ayres	Floated
Drumahoe	July 29	Ashore	Lake St. Francis	Floated
Dorr	July 24	Collision	East Greenwich	Starboard bulwark
Denderah	July 31	Collision	Santos harbor	Badly
Evangeline	July 16	Disabled	New Brighton	Engine; pumps
Eugenia	July 8	Aground	Nr. St. Raphael	Not stated
Evgenia	July 9	Capsized	Copenhagen	Abandoned
Elvington	July 22	Ashore	Hoijen Skaw	Floated
Eastgate	Aug. 9	Aground	Paso Paraguayo	Not stated
Federal	July 17	Aground	River Scheldt	Floated
Fukuko Maru	July 4	Aground	Off Nemuro	Not stated
Frankenwald	Aug. 6	Aground	Punta Island	Not stated
Farnorth	Aug. 11	Ashore	Nix Mate	Floated
Harbor Jensen	July 18	Aground	St. John	Plates—lost propeller
Hayatomo Maru	July 10	Ashore	Tokuyama	Not stated
Hirana Maru	July 17	Ashore	Nr. Reibun Island	Not stated
Hillsborough	Aug. 1	Struck object	Tidweater Oil Docks	Shaft: propeller
Hartford	Aug. 30	Disabled	Connecticut River	Stearing gear
Hsin King	July 21	Collision	Shantung Promontory	Sank
Hermes	July 24	Stranded	N. E. Aden	Not stated
Gilchrist	July 14	Ashore	Chippewa Point	Floated
Golden Gate	July 13	Fire	Government Island	Damaged
Gunny	July 18	Struck wharf	Bridgewater, N. S.	Not stated
Golden Forest	July 13	Ashore	Tigalda	Floated
Ganges Maru	July 11	Fire	Hong Kong	Not stated
Gerard	July 18	Aground	Milford Haven	Badly
Gondul	July 30	Collision	Greenhithe	Starbd. side
Idle Hour	July 14	Fire	Long Island Sound	To water's edge
Ilhavense	July 14	Ashore	St. Shotts	Total loss
Ile De France	Aug. 1	Struck Pier	Havre	Above waterline
Isobel Morse	Aug. 1	Ashore	Salmon Bight	Floated
Juno	July 3	Collision	Danzig	Stem
J. A. Moffett, Jr.	Aug. 1	Struck obs.	Cooper River	Propeller bent
John and Mary	Aug. 4	Ashore	Normans Island	Not stated
Jupiter	Aug. 1	Ashore	Hansweerd	Floated
Kilvey	July 5	Collision	Antwerp	Not stated
King Cadwallon	July 10	Fire	East of Durban	No. 2 hold
Kiowa	July 9	Aground	Bar Point	Not stated
Kerhonkson	July 18	Collision	Belfast	Plate: starboard side
Kangars	July 21	Collision	Rotterdam	Not stated
Kintambo	July 19	Aground	Kasai	Sank
King Helga	July 21	Sank	Ivistein Lighthouse	
Lebanon	July 23	Aground	Detroit	Floated
Lio	July 16	Collision	Off Cape Flattery	Superstructure
Levenbridge	July 24	Ashore	Mucaros Reef	Floated
Leopold de Wael	July 5	Collision	Antwerp	Not stated
Leerdam	July 7	Aground	Off St. George, Azores	Bottom
Le Norvigien	July 8	Stranded	Off Diego Suarez	Bottom; forepeak
Lake Frugality	July 23	Collision	St. Clair River	Not stated
Lake Moraflores	Aug. 4	Struck dock	San Pedro	Steering gear
Little Silver	Aug. 4	Disabled	Crescent Club	Not stated
Mauna Ala	July 17	Fire	Seattle	Badly
Maritima	July 15	Sank	Off Georges Shoal	
Munrio	July 25	Struck quay wall	Buenos Ayres	Starboard side
Margot	July 9	Disabled	Karlshamn	Machinery
Margrethe	July 10	Collision	Off Cuxhaven	Sank
Mercer	July 12	Struck quay wall	Liverpool	Plate
Maytham	July 23	Collision	St. Clair River	Plates; stern
Mandu	July 30	Collision	Santos harbor	Not stated
Mount Hope	Aug. 1	Disabled	Newport	Engine
Moore	July 22	Ashore	Rock Angus	Not stated
Morocco	July 22	Not stated	Falmouth	Leaking
Maria Luisa	July 30	Collision	Rio Grande	Badly
Melrose	July 31	Aground	River Scheldt	Floated
Merganser	July 30	Collision	Antwerp	Above waterline
Newaster	July 19	Collision	Off Quebec	Leaking
Nubian	July 20	Aground	South Point	Floated
Nagasaki Maru	July 10	Struck Wharf	Shanghai	Propeller
Navigator	July 17	Collision	Brunsbuttel roads	Damaged
Nieuwendom	Aug. 1	Collision	Ymuiden	Below waterline
Olga	July 21	Collision	Rotterdam	Bridge deck
Panoil	July 18	Fire	Muskegon	Badly
Pakipaki	July 16	Fire	London	Forepeak
Profit	Aug. 3	Collision	Staten Island	No. 2 hatch
Palsterbo	Aug. 8	Fire	Port Arthur	Badly
Pacific Trader	Aug. 1	Fire	Glasgow	Bulkhead
Penmarch	July 20	Collision	St. Catherine's Point	Sank
Palermo	July 20	Collision	St. Catherine's Point	Stem
Philip T. Dodge	July 20	Ice	At sea	Bottom
Rose Dempsey	July 20	Sank	Nr. Rockaway	
Risskov	July 18	Aground	Maassluis	Floated
Ruth Sykes	July 30	Aground	Caibarien	Floated No. 2 tank
Rotha	July 24	Collision	N. of Point d'Ailly	Stem
Santa Inez	July 16	Collision	Off Cape Flattery	Damaged
Shelley	July 7	Disabled	Alderney	Engine
Shunsen Maru	July 7	Ashore	Quelpart	Not stated
Solent	July 8	Sank	Zeebrugge Mole	
Scheldejol	July 10	Sank	Zeebrugge	
Smut	July 10	Collision	Off Cuxhaven	Not stated
Seaforth	July 12	Collision	Lat 50:22	Sank
Stor	July 11	Fire	Kiel	Not stated
Santa Tecla	July 28	Disabled	Kingston	Engine
San Juan	July 16	Stranded	Nr. Cabo Villan	Not stated
Serafin Topic	July 16	Struck pier	Albert Edward Dock	Not stated
Stephen R. Jones	Aug. 1	Aground	Conimicut Point	Not stated
Shawnee	Aug. 8	Aground	Saquenay River	Propeller
Skipjack	July 18	Ashore	West Scaw	Not stated
Sumatra	July 19	Aground	Mascali Island	Floated
Sambre	July 30	Collision	Rio Grande	Port Side
Skrymer	July 23	Disabled	At sea	Engine
Thomas Maytham	July 15	Collision	St. Clair River	Forepeak
Taurus	July 15	Aground	Rockaway Beach	Floated
Tenkai Maru	July 7	Collision	Shimonoseki	Leaking
Tamatsu Maru	July 11	Aground	Nr. Notorosaki	Floated
Tara	July 17	Aground	Buenos Ayres	Floated
Tongariro	July 17	Ashore	East of Ras al Ara	Floated
Tugela	July 31	Grounded	Galveston	Floated
Tatsuno Maru	July 21	Collision	Shantung Promontory	Bows
Thordoc	Aug. 12	Ashore	Antigonish Point	Not stated
Tyne	July 30	Collision	Greenhithe	Stem
Ulven	July 18	Aground	River Scheldt	Not stated
Ulm	Aug. 1	Fire	Philadelphia	Not stated
Vimeira	July 22	Struck iceberg	Lat. 42:40N, Lon. 49:44W	Engines
Venezuela	July 25	Ashore	Salmerina Banks	Floated
Van Cloon	July 7	Fire	Sourabaya	Not stated
Vale of Pickering	July 24	Collision	N. of Point d'Ailly	Sank
West Humhaw	July 14	Disabled	Teneriffe	Machinery
Windsor	July 23	Struck sbmgd wrk	Kills	Propeller
Walter Leonhardt	July 4	Ashore	Oesel Island	Not stated
Wildwood	July 30	Fire	Charleston	No. 1 hold
Wabana	July 28	Collision	St. Lawrence	No. 1. hold, floated
Winslow	Aug. 5	Not stated	Lat. 44N Long. 30W	Machinery
Walkyrie	July 21	Aground	Nr. Cap d'Ontifer	Not stated
West Cape	Aug. 6	Fire	San Francisco	Slight
Yaval County	July 13	Disabled	London	Steering gear
Yomei Maru	July 4	Ashore	Nr. Kamaishi	Not stated

Marine Review

Reg. U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water

March, 1930

WEATHERPROOFED

Thru and Thru

The All-Weather Rope

Although Columbian *Tape-Marked* Rope has been waterproofed for years, the Columbian method of waterproofing has now attained such a degree of perfection that the rope is more than waterproofed, it is all-weatherproofed, containing such characteristics as these:—

Each individual fibre is thoroughly impregnated.
Sealed against action of elements.
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Flexible wet or dry and in any climate.
Lasting durability and excessive strength.
Specifically Guaranteed and easily identified.

Columbian is the ideal rope for all climates. Always have it on board.

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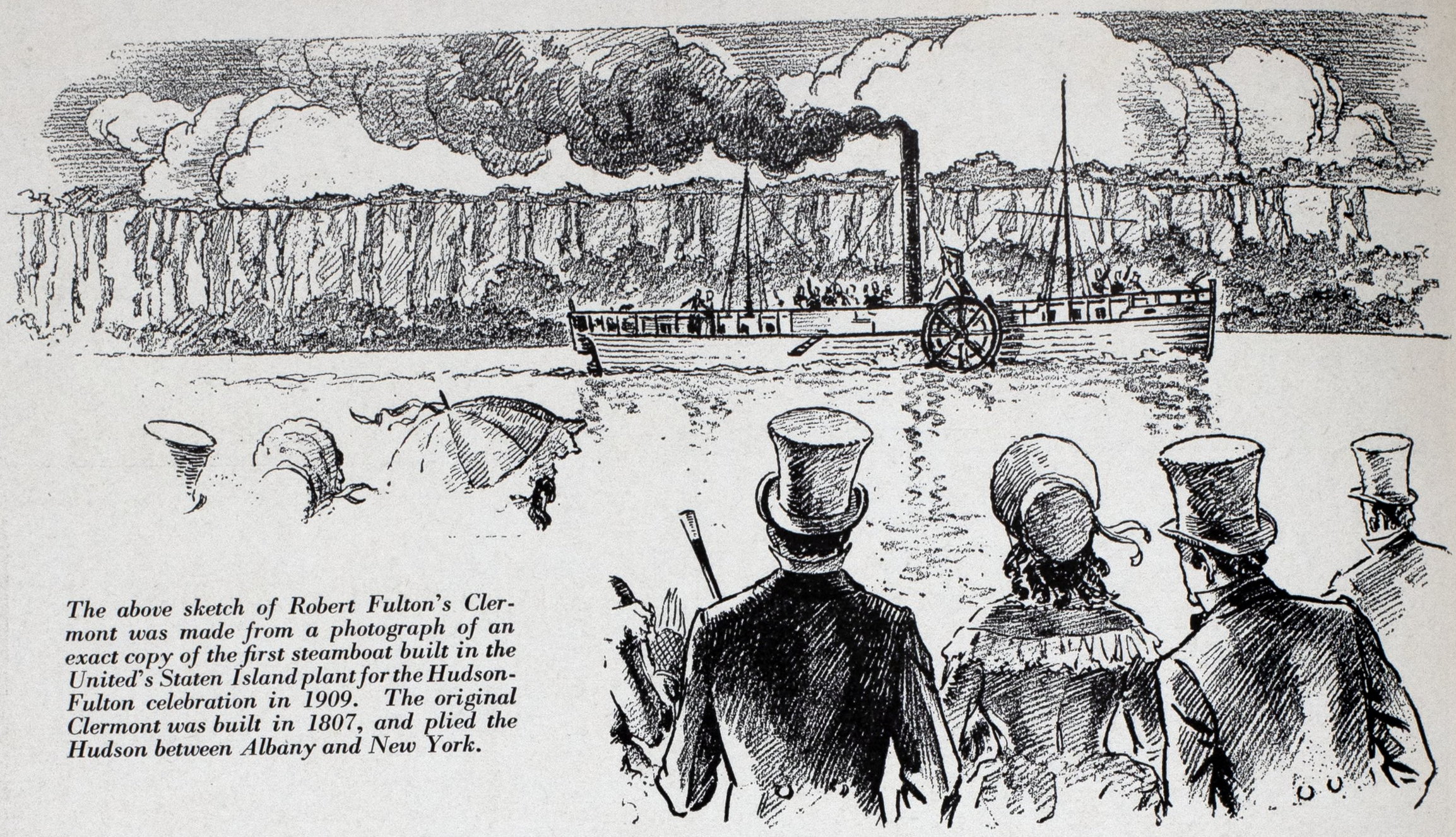

The above sketch of Robert Fulton's Clermont was made from a photograph of an exact copy of the first steamboat built in the United's Staten Island plant for the Hudson-Fulton celebration in 1909. The original Clermont was built in 1807, and plied the Hudson between Albany and New York.

Progress—

GREAT has been the progress in ships in the one hundred and twenty-three years since the Clermont. To that product of the genius of Fulton may be traced the ancestry of the giant liner of today, but all else has changed.

In the refining process of time, ship repairing, as well as shipbuilding, has become an art. No task in the field of marine repairs is too great or too exacting for the new craftsman. With his experience, modern methods and machinery, he is a specialist in service.

On this, its first anniversary, United Dry Docks, Inc., closes twelve months of superior service to ship owners. Under its year-old name, United has met the needs of shipping with an ability developed by its plants in more than half a century of experience.

United offers the ship owner the unequalled facilities of six plants, conveniently located in New York Harbor. These facilities include 27 dry docks, among them the largest private floating dock in America, a specialized Diesel division, and complete equipment for shipbuilding, repairing and converting.

MORSE STATEN ISLAND FLETCHER SHEWAN CRANE ALDERTON

UNITED DRY DOCKS, INC.

11 BROADWAY DIGBY 0500 NEW YORK

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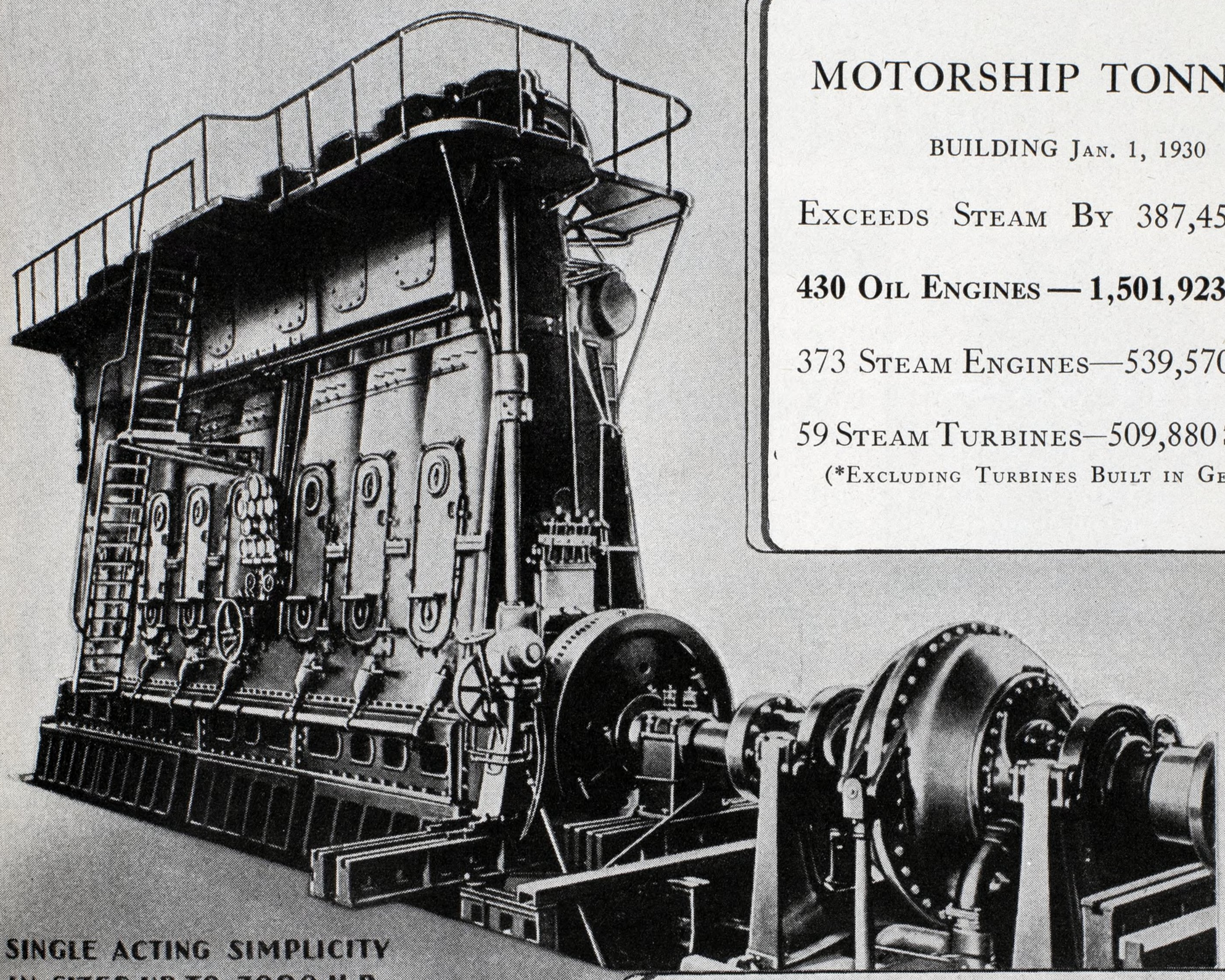
BUSCH-SULZER

TWO-CYCLE DIESEL MARINE ENGINES



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373 STEAM ENGINES—539,570 I.H.P.

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(*EXCLUDING TURBINES BUILT IN GERMANY)

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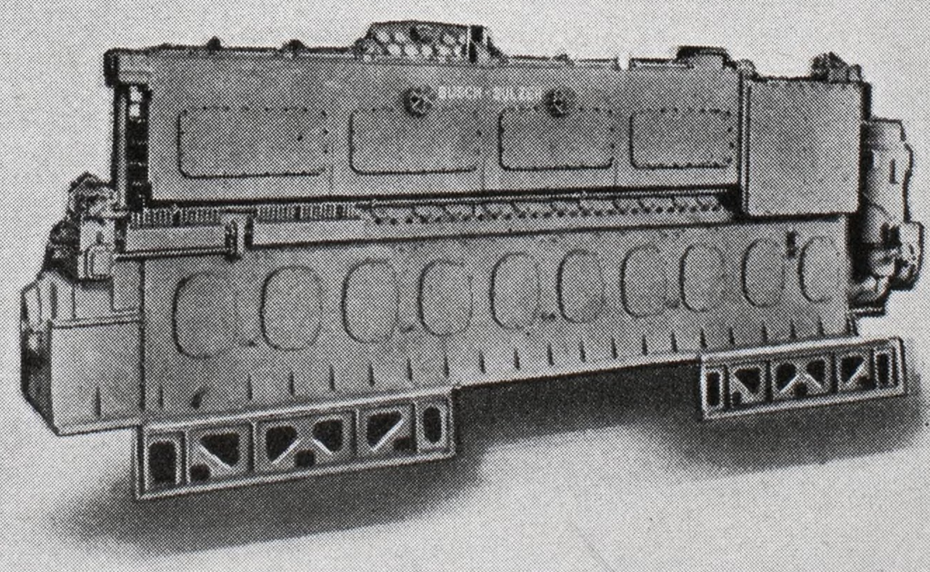

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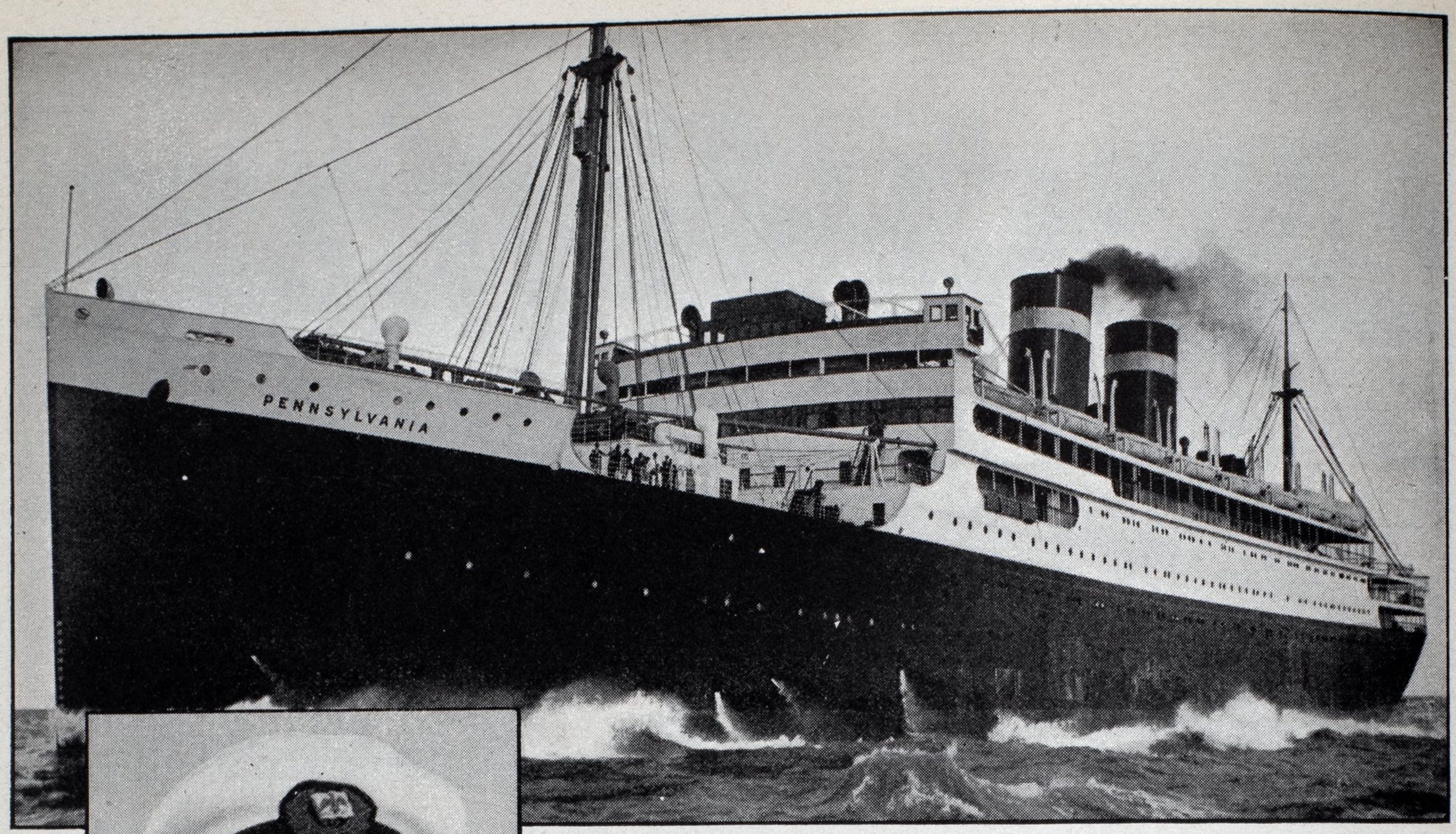

S. S. Pennsylvania, latest addition to the Panama-Pacific Line's fleet. Two steam turbines generate the power for a pair of 8500-h.p. motors.

Chief Engineer John Carstairs

World's largest electrically-driven commercial vessel lubricated with Gargoyle Marine Oils

With the addition last fall of the *Pennsylvania* to the Panama-Pacific Line fleet, the world's largest electrically-driven commercial vessel went into service.

Of twin-screw design, each of the *Pennsylvania's* propellers is directly connected to an electric motor capable of developing 8500 h.p. Two 6750-shaft-horsepower steam turbines are used to generate the electricity for these motors.

As in the Panama-Pacific Line's two other ships of this type, *California* and *Virginia*, Gargoyle Marine Oils are employed to insure maximum efficiency in the engine room.

Like hundreds of other experienced marine engineers, Chief Engineer Carstairs knows the practical economies resulting from regular use of these high-quality lubricants —a substantial saving in fuel and oil consumption, fewer repairs and longer engine life.

In more than 300 of the world's leading ports, representatives of the Vacuum Oil Company are ready at all times to aid in solving your lubricating problems. These men are thoroughly familiar with every type of marine engine. Feel free to call on them.

NOTE: We will be glad to send you, without obligation, either of our authoritative treatises on Marine Lubrication: "Steamships with Reciprocating Engines", "Marine Lubrication—Motorships". Address your request to: Vacuum Oil Company, Marine Sales Department, D-3, 61 Broadway, New York City.

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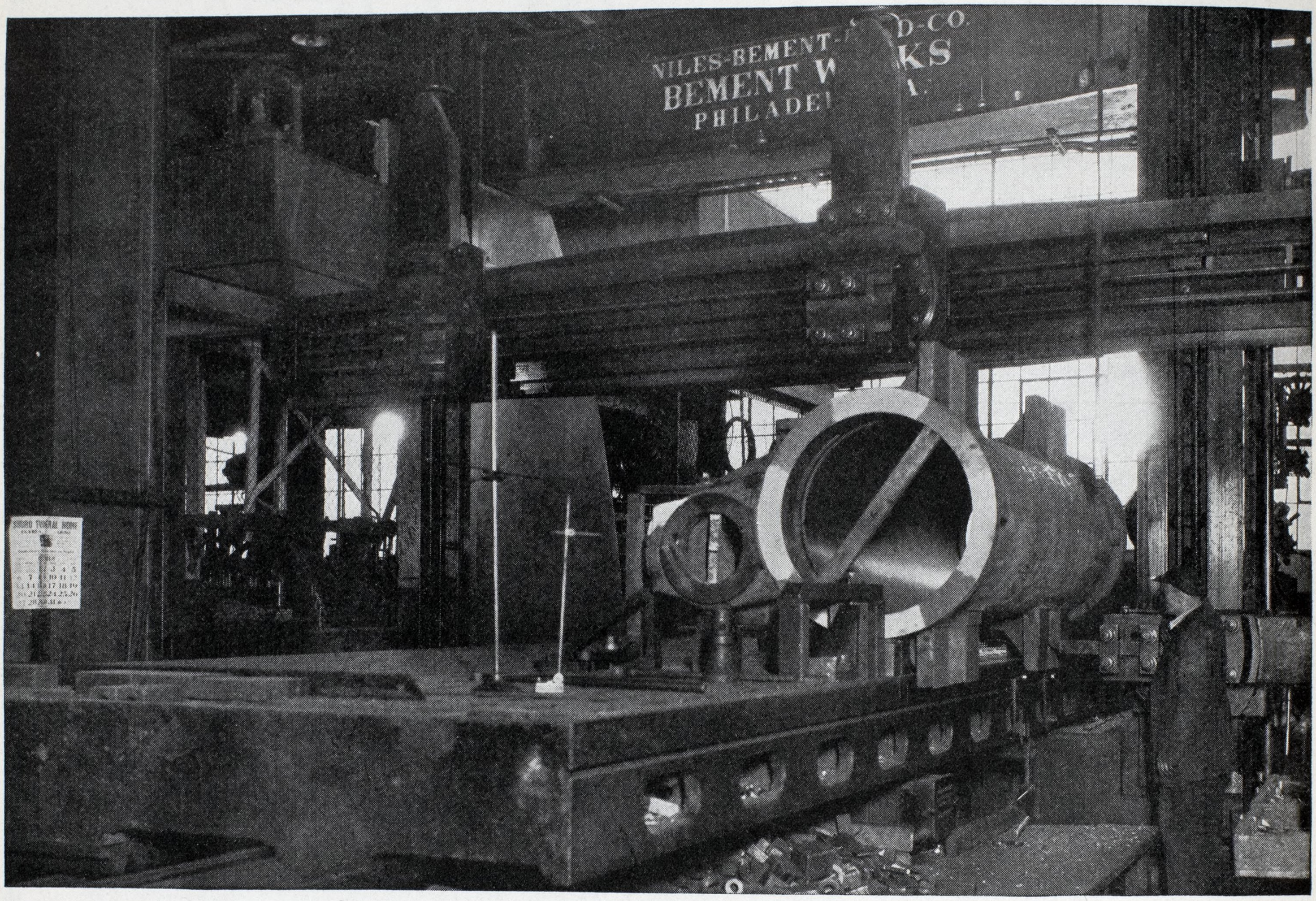
Big enough to handle any ship repairs



This 14-foot planer is planing the flanges of a large cylinder casting to conform with close specifications. It handles any size job up to 14′ 2″ wide by 25′ long by 10′ 6″ high. Equipment of such marked flexibility helps "American" repair your ships swiftly.

CR--RR-UNCH! And a hunk of metal drops off. Tirelessly, efficiently, this big planer shaves its work accurately down to the correct size, be it large or small.

Yet this giant machine is only one of many varieties in this "American Ship" shop; and the shop only a portion of the complete ship building and repair resources at each of "American's" five strategically located yards. Here, the layout of all equipment has been so planned and the equipment so selected, that the time required for your ship repairs is reduced to the minimum.

This feature makes "American Ship" especially helpful to all ship operators—particularly since "American" gives them the additional assurance of accurate, dependable, economical repair work.

That such extensive repair facilities bestow rare flexibility upon the large, completely equipped ship building companies, and also raise efficiency and economy to the peak, is obvious to ship operators.

They recognize, too, that it is vital for them to keep these resources mobile, by a continuous, regular flow of repair work.

That's why more and more ship operators are turning to "American Ship" for *all* their repairs—large and small.

The AMERICAN SHIP BUILDING CO.

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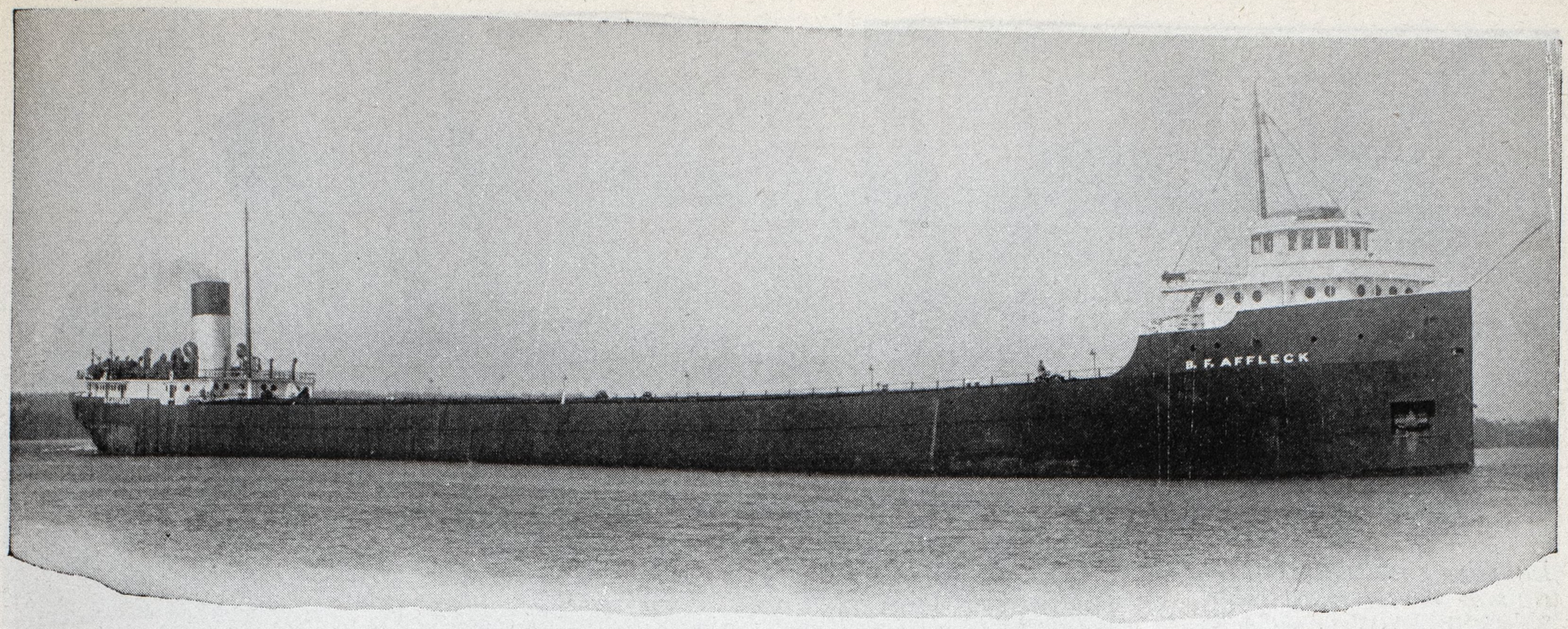

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S.S. B. F. Affleck owned and operated by the Pittsburgh Steamship Company, is a single deck bulk cargo vessel of the standard type built for the iron ore, coal and stone trade of the Great Lakes. Her molded dimensions are: Length overall, 604 feet, length between perpendiculars, 580 feet; width 60 feet and depth 32 feet. Capacity 12,000 tons.

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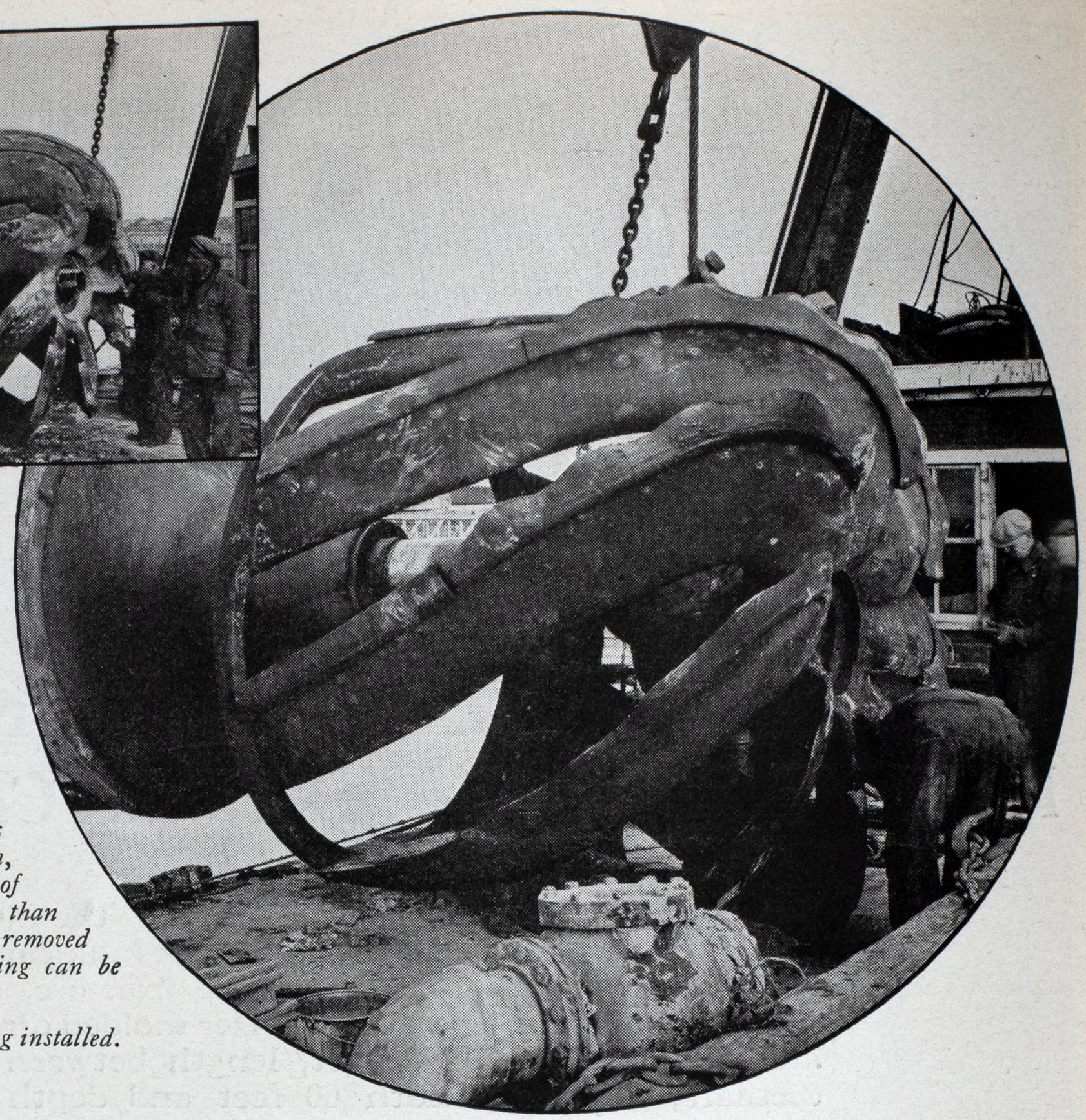


Installing a new cutter—weight ten tons—on the dredge NEW JERSEY. Photo at right shows the old cutter being removed. This huge set of knives revolves continually in clay, sand and other gritty substances. The Goodrich bearing, carrying the shaft on which it turns, is operating under the most difficult condition conceivable. Yet after more than 4,000 hours of digging, the bearing, on inspection, showed less than an eighth of an inch of wear, the shaft no wear at all. More than 1,500,000 cubic yards of earth were removed during this time. Location of bearing can be plainly seen in photo.

Photo above shows the new cutter being installed.

Goodrich Bearing, made of *rubber* and *lubricated* with *water*, ASTONISHES ENGINEERS *on*

ONE and a half million cubic yards of earth have been removed by the dredge New Jersey since this Goodrich Cutless Rubber Bearing was installed.

It has been in operation over *four thousand hours!* Before installation the opinion was expressed that 1,500 hours would be a satisfactory record for the bearing! Engineers on the dredge now state that *a half dozen bearings of any other type would have been used during this time.*

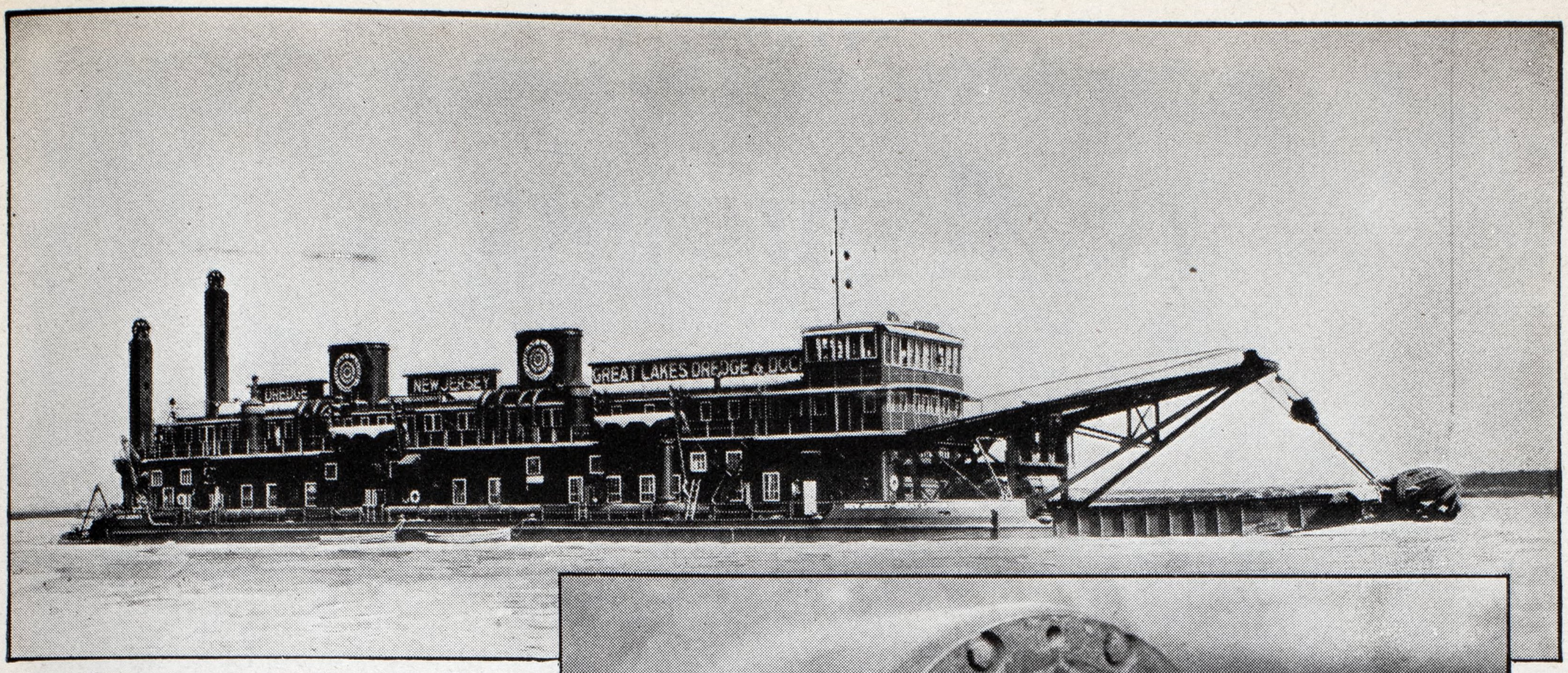
The cutter which this bearing carries weighs approximately *ten tons;* the shaft is *14½ inches* in diameter. Six of these cutters have been worn out since the bearing was installed. Accompanying photographs show the *seventh* cutter being installed.

Yet after these 4,000 operating hours, the bearing shows *less than an eighth of an inch* of wear. Wear on shaft is *not measurable!*

The Goodrich Cutless rubber bearing is based on two characteristics of rubber which are often overlooked —its peculiar resistance to wear and its low coefficient of friction *in contact with metal*, when wet. This Goodrich bearing is lubricated with water—just as efficiently as other bearings are lubricated by oil.

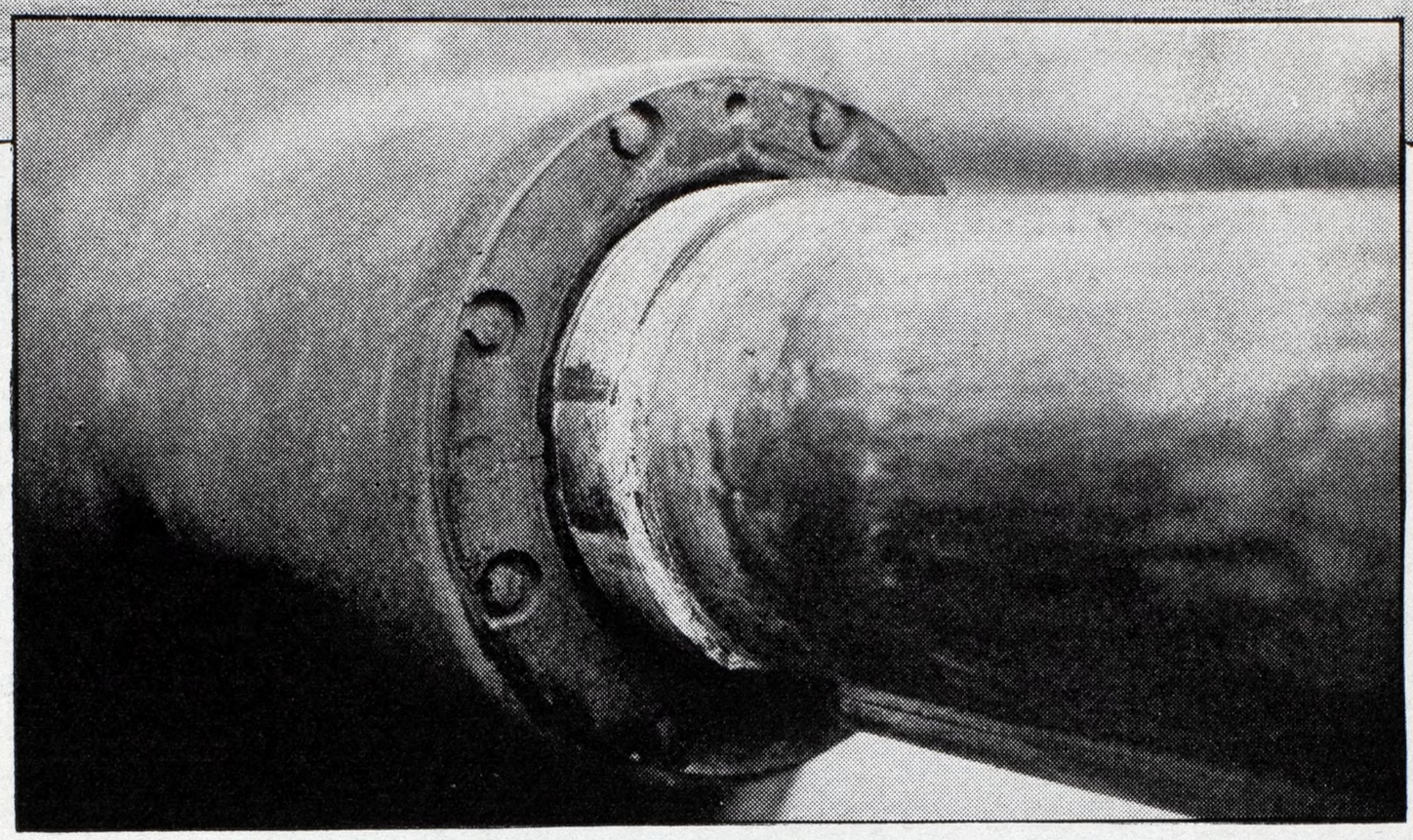
It is made of a special rubber compound developed by Goodrich — a rubber with unusual resistance to abrasion. Hard sand particles, which cut and score other types of bearings, are depressed into the rubber and rolled away without damage.

Engineers now predict the future use of Goodrich rubber bearings on the world's largest ships. Already their use is widespread in marine service. Ships of every size and purpose, from ocean-going vessels down to tiny pleasure crafts are avoiding the expense of frequent bearing renewal by use of these bearings. Over 60 per cent of the builders of standardized boats use them as standard equip-



The dredge NEW JERSEY, *owned and operated by the* GREAT LAKES DREDGE & DOCK CO., *the largest in the world from a standpoint of power. Built by the Manitowoc Shipbuilding Co., Manitowoc, Wis. Dredge machinery supplied by the Bucyrus-Erie Company, South Milwaukee, Wis. Powered with four 1,150 B.H.P. Busch Sulzer Diesel engines operating at 180 R.P.M. and direct coupled to General Electric generators. These generator sets supply current for all the power on the dredge and also drive the main dredge pump and booster pump. Cutter and shaft of suction arm supported in 14½" (inside diam.) Goodrich Cutless Bearing.*

Right: A close-up of the bearing, taken while the cutter was being replaced.



ment. The largest ships in the Coast Guard are equipped with them. It has been demonstrated that size makes no difference, as long as the bearing loads are maintained within safe limits.

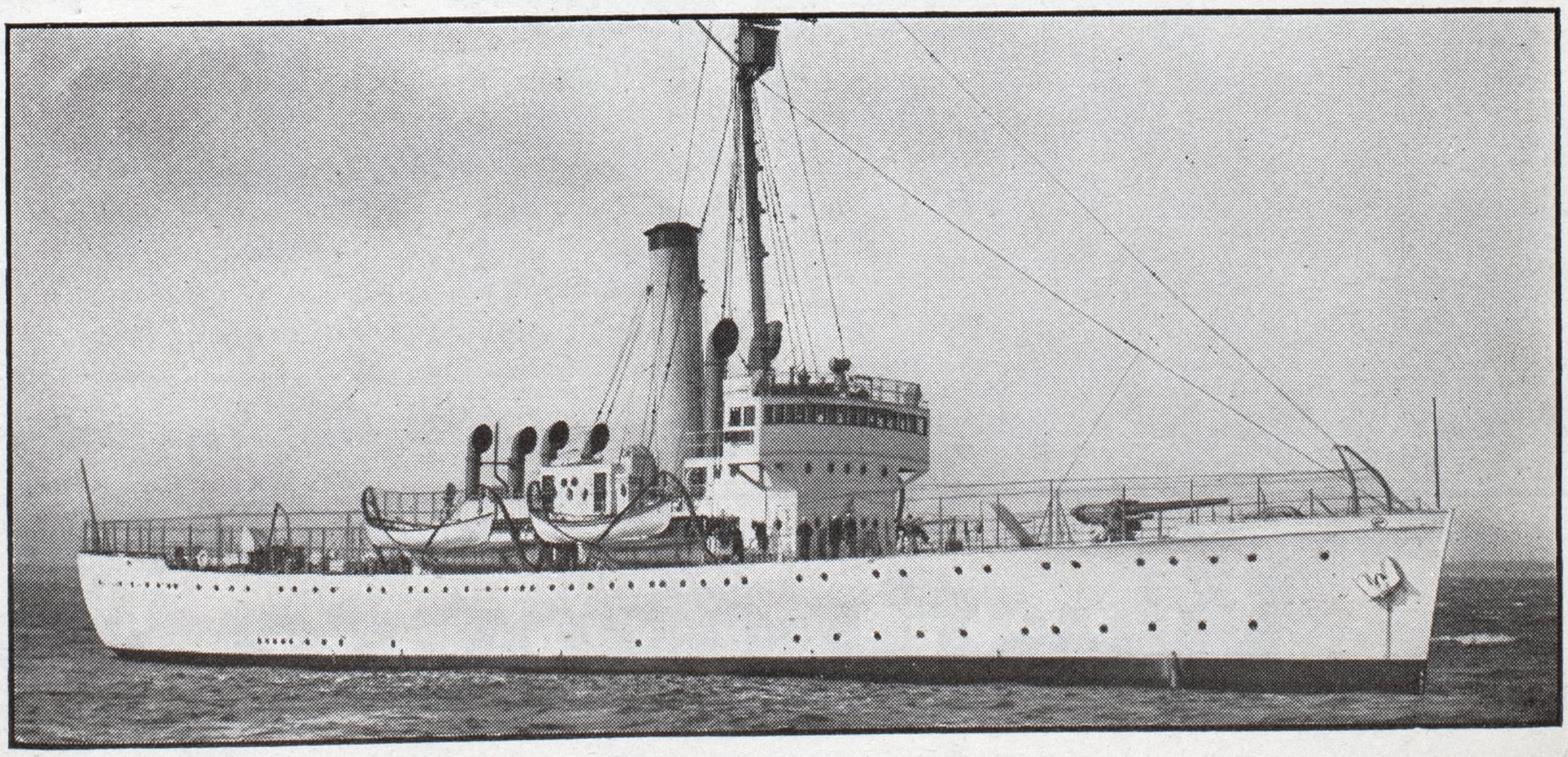
Goodrich bearings are used extensively on horizontal centrifugal sand and dredging pumps and deep-well turbine pumps. In hydraulic turbines many are in satisfactory operation with shafts up to 30 inches in diameter.

In literally thousands of cases, where oil lubrication is difficult, or where sand and grit are present, it has been definitely shown that they *outwear every other type of bearing.*

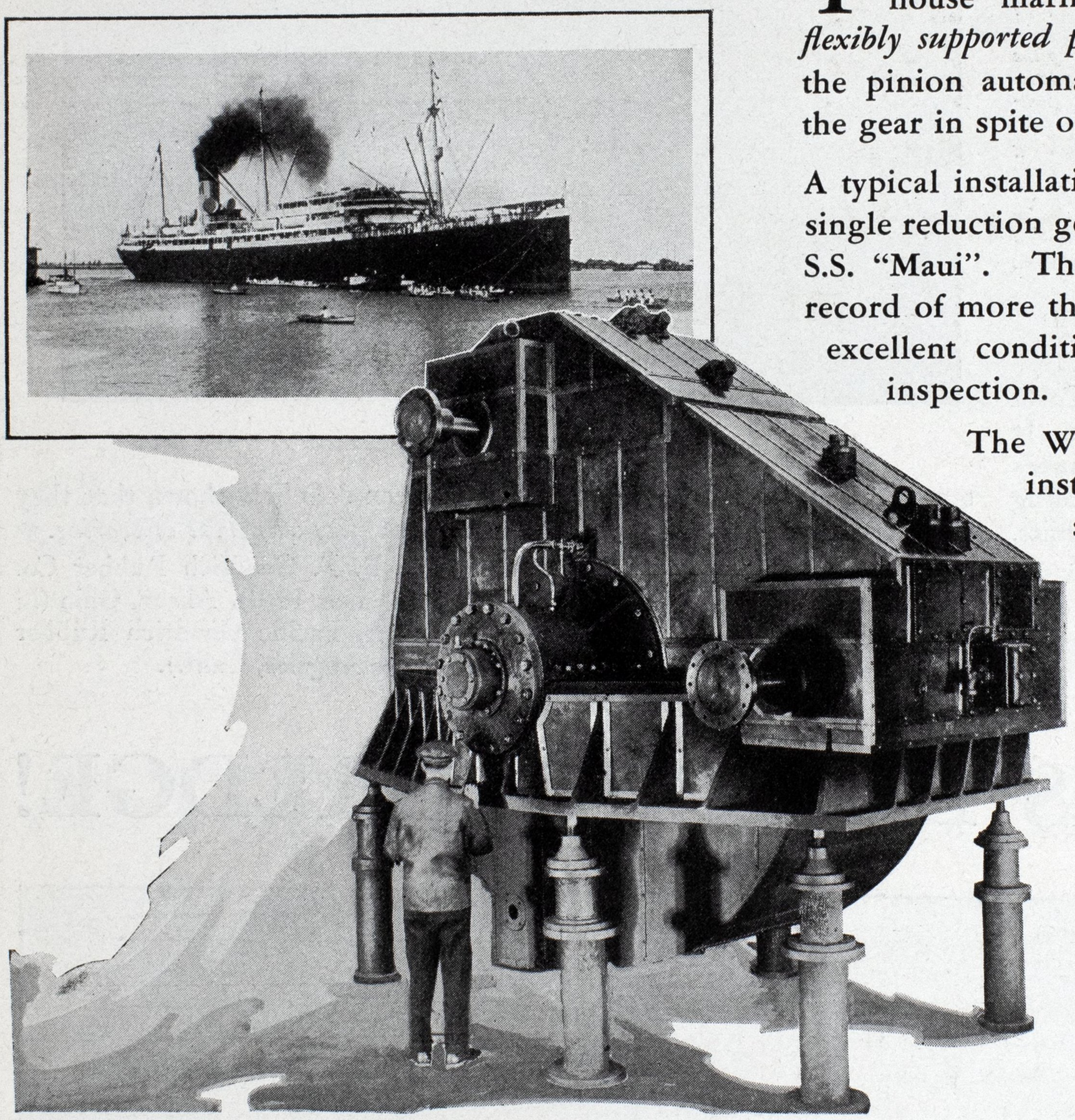
The B. F. Goodrich Rubber Co. (Established 1870), Akron, Ohio (in the west, Pacific Goodrich Rubber Co., Los Angeles, Calif.).

WORLD'S LARGEST DREDGE!

Photo shows the new 232' turbo-electric drive cutter TAHOE, *one of the latest additions to the U. S. Coast Guard fleet. The* TAHOE, *with its sister ships, the* PONCHARTRAIN CHELAN, MENDOTA *and* CHAMPLAIN, *are equipped with 14 13/16" Goodrich Cutless rubber forward bearing and after stern tube bearings 14 5/8" inside diameter. Bethlehem Shipbuilding Co., builders. Speed better than 16½ knots per hour. Total shaft h.p., 3,200 Complete propelling and auxiliary machinery designed and built by Westinghouse Electric and Manufacturing Co.*



the PINION *IS* ALWAYS *in alignment*



THE outstanding feature of a Westinghouse marine reduction gear is its *flexibly supported pinion frame,* which keeps the pinion automatically in alignment with the gear in spite of gear case distortion.

A typical installation is the two 5,000 shp., single reduction gears aboard the twin-screw S.S. "Maui". These gears with a service record of more than 1,000,000 miles are in excellent condition, as shown by a recent inspection.

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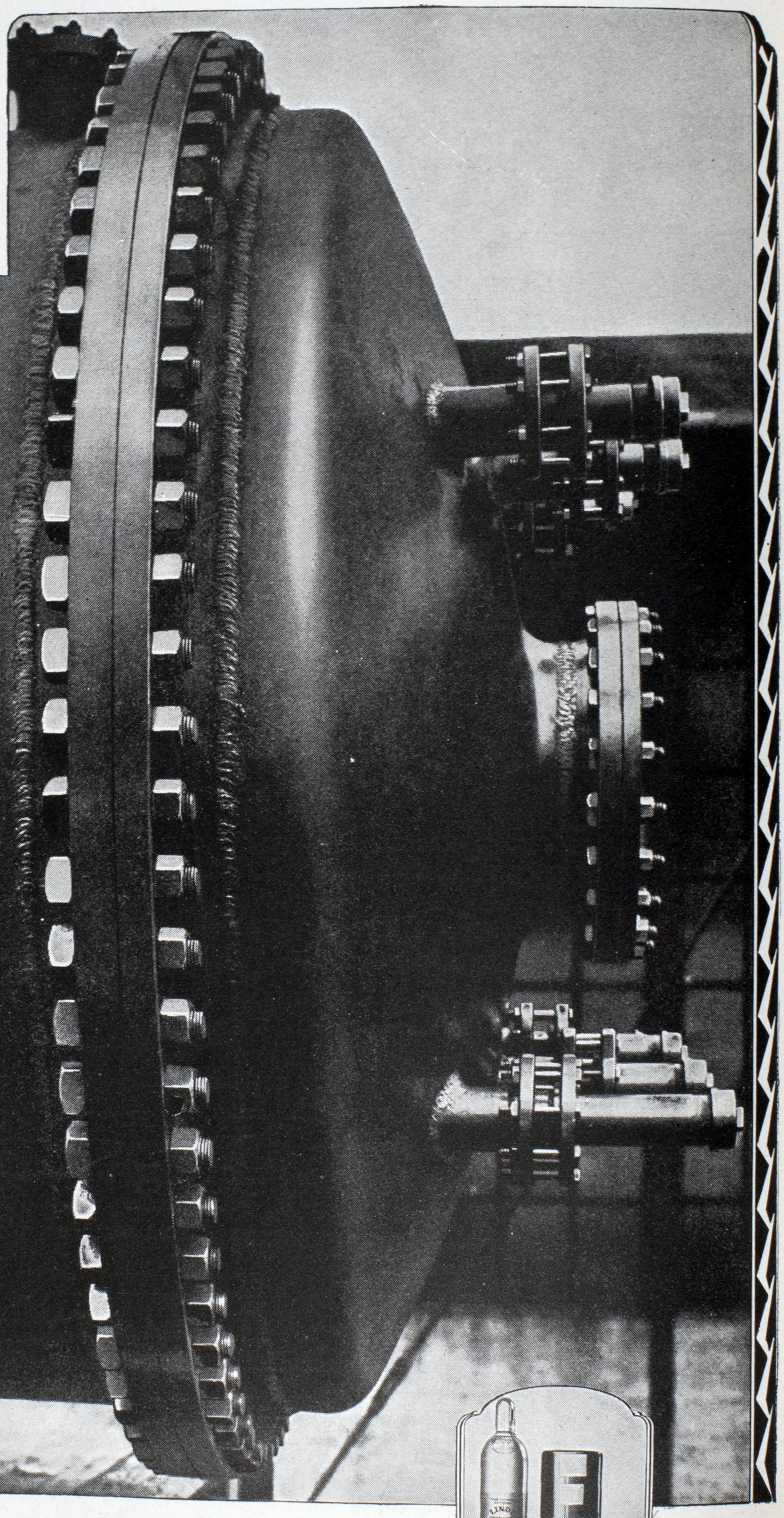

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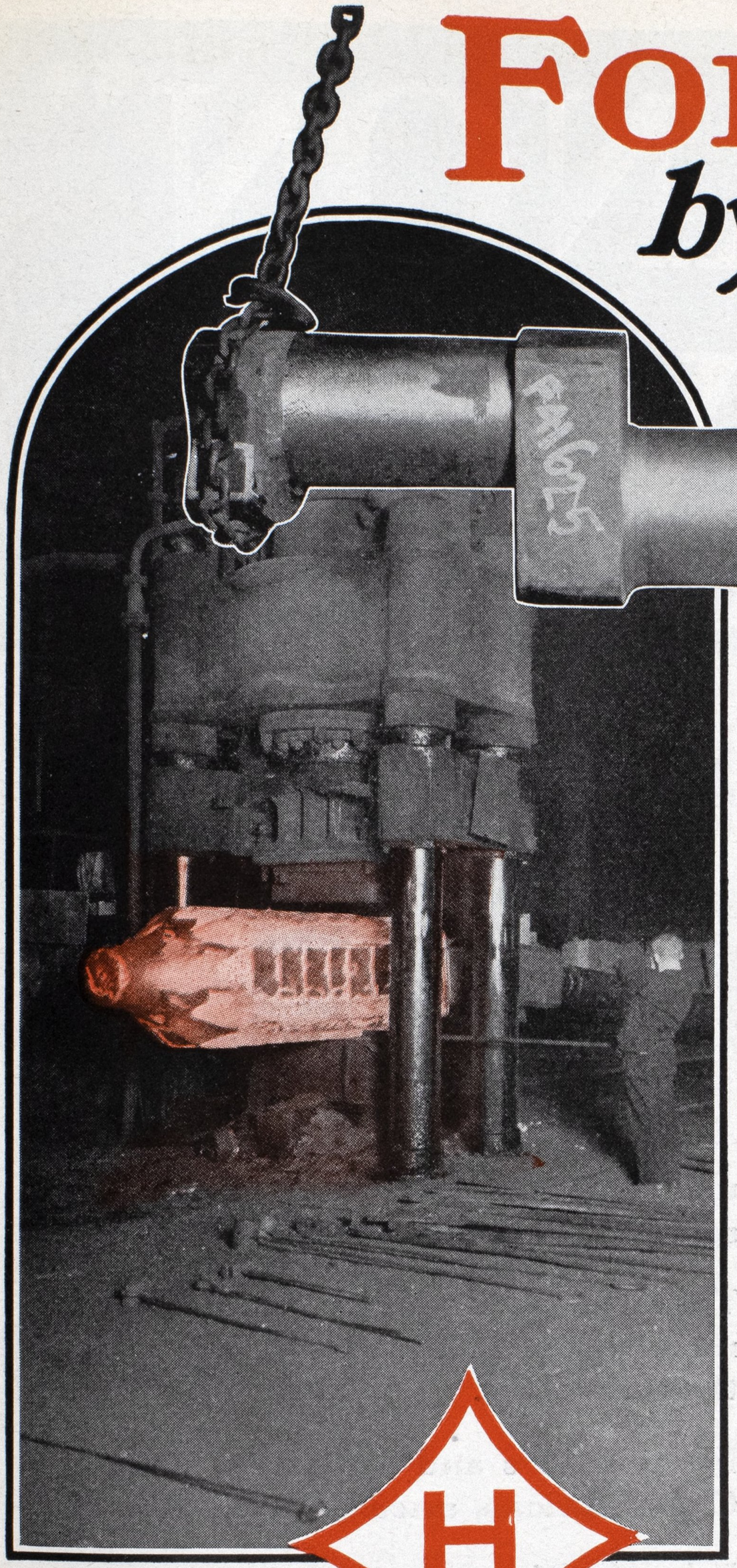


THE hundreds of customers who now specify Heppenstall forgings are familiar with the dependability of Heppenstall service.

To thousands of other purchasers of forgings, manufacturers demanding meticulous combinations of alloys, honest workmanship, experienced heat treating and the facilities of a modern plant in which production is controlled under one roof from pig iron to rough machine forgings — ***Heppenstall service*** is offered.

Experienced metallurgists and laboratory experts are at your command. Skilled engineers will confer with you on specifications. The entire service will culminate in products presenting full and complete satisfaction.

HEPPENSTALL COMPANY

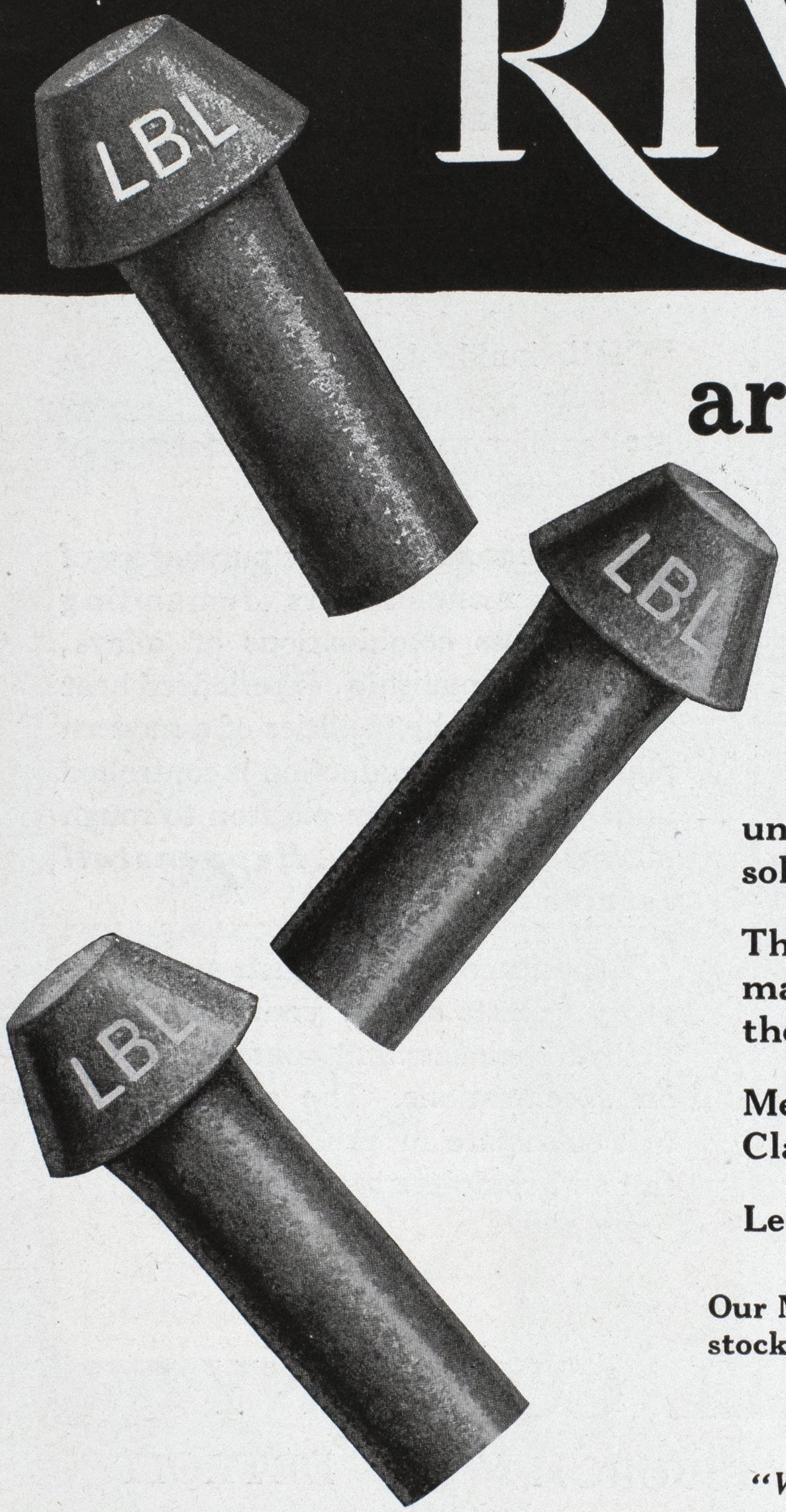
BRIDGEPORT PITTSBURGH DETROIT

Branch Offices:

Boston, Bridgeport, New York, Philadelphia, Buffalo, Fenwick Freres
Denver, Cleveland, Detroit, Indianapolis, Syracuse, Paris,
St. Louis, Milwaukee, Fort Worth, Los Angeles, Chicago, France

HEPPENSTALL

"LEBANON" RIVETS



are *real* rivets!

MADE of Genuine Puddled Wrought Iron, *Lebanon* Rivets are tough, long-lasting and offer the maximum resistance to corrosion.

They are a *quality* product—uniformly free from defects and are sold at a reasonable price.

They can be depended upon to cut maintenance costs on repairs below the water-line.

Meet Lloyd's and American Bureau Classifications, *unconditionally.*

Lebanon Rivets are *real* rivets.

Our Mills at Lebanon and Scranton carry large stocks and can meet your fullest requirement.

Send for Illustrated Folder,

"Wrought Iron Stands the Test of Time."

Wrought Iron Company of America

Largest Producers of Wrought Iron Bars in the United States.

General Offices: Lebanon, Pa.

Works: Lebanon and Scranton, Pa., and Rome, N. Y.

Sales Offices:

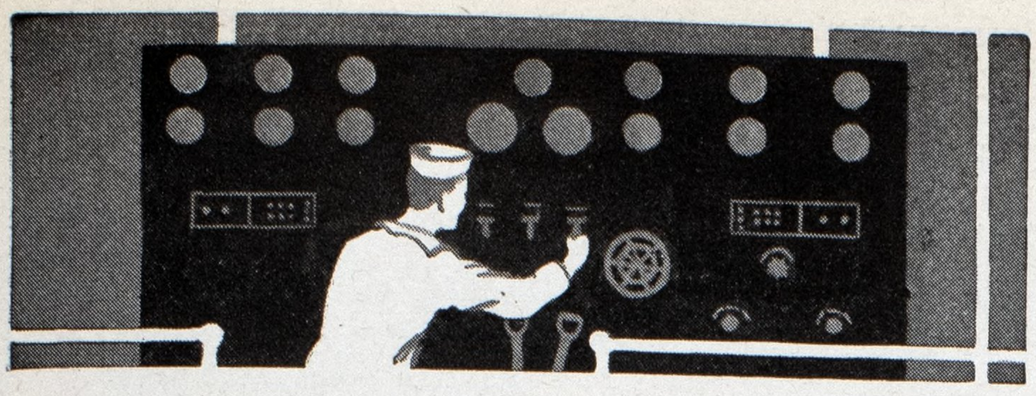
PHILADELPHIA
Commercial Trust Building

NEW YORK, 393 Seventh Avenue
Phone: Penn 5919

BOSTON
161 Devonshire Street

RICHMOND, VA.

MOBILE, ALA.

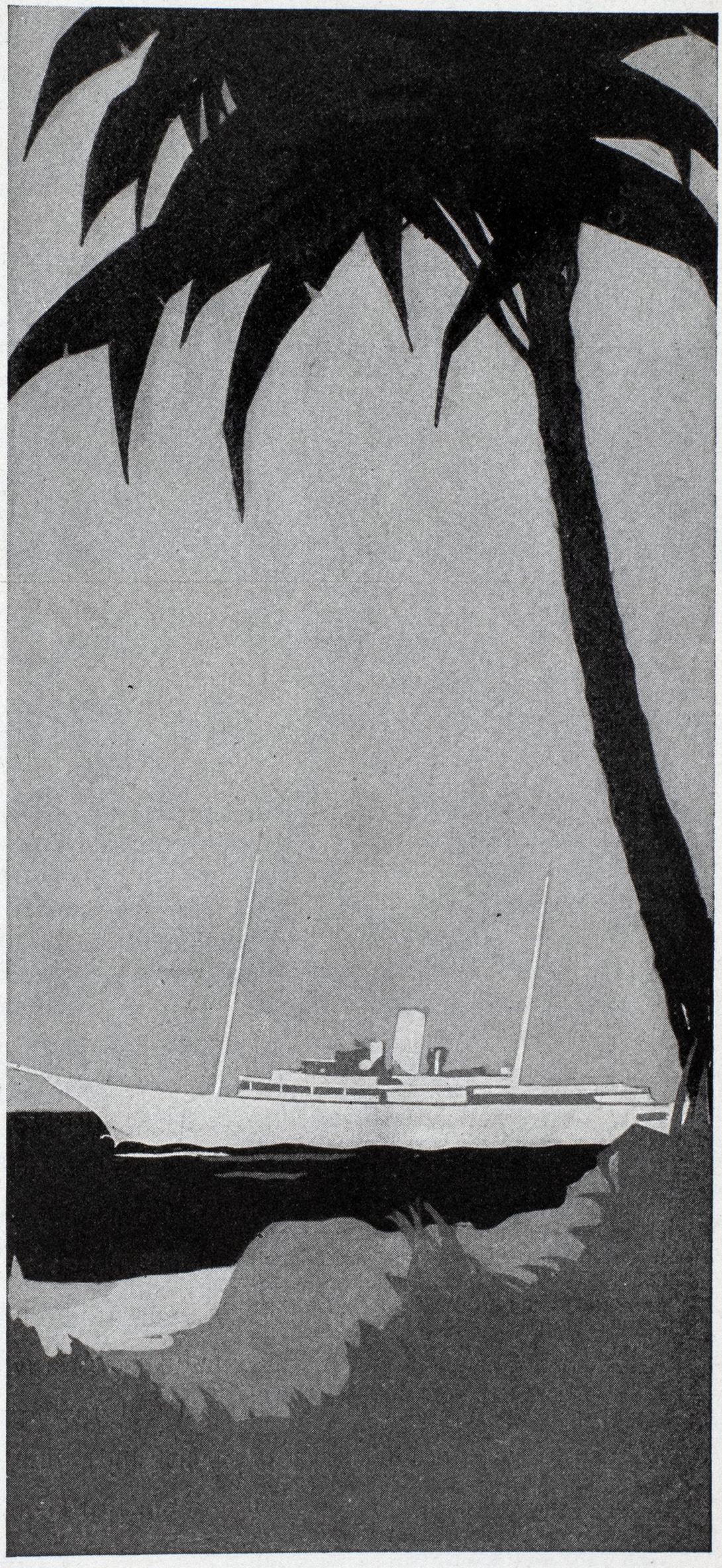


A MARVEL OF SIMPLICITY

EVEN to the inexperienced eye, the engine room of the all-electric ship is a marvel of simplicity and completeness. A few electric cables and switches have supplanted the usual network of pipe lines and valves. From a single panel, the operating engineer can diagnose conditions in every part of the power system.

For here the mighty force that drives the modern ship is cleanly generated and simply controlled. Here is the source of that flexible performance, uniform efficiency, smooth speed, and amazing endurance peculiar to the all-electric vessel. And here is the secret of its unequalled operation—free from noise and vibration.

In this transitional period, the exceptional facilities and practical experience of General Electric are at the disposal of ship builders and ship owners who would keep in step with maritime progress.

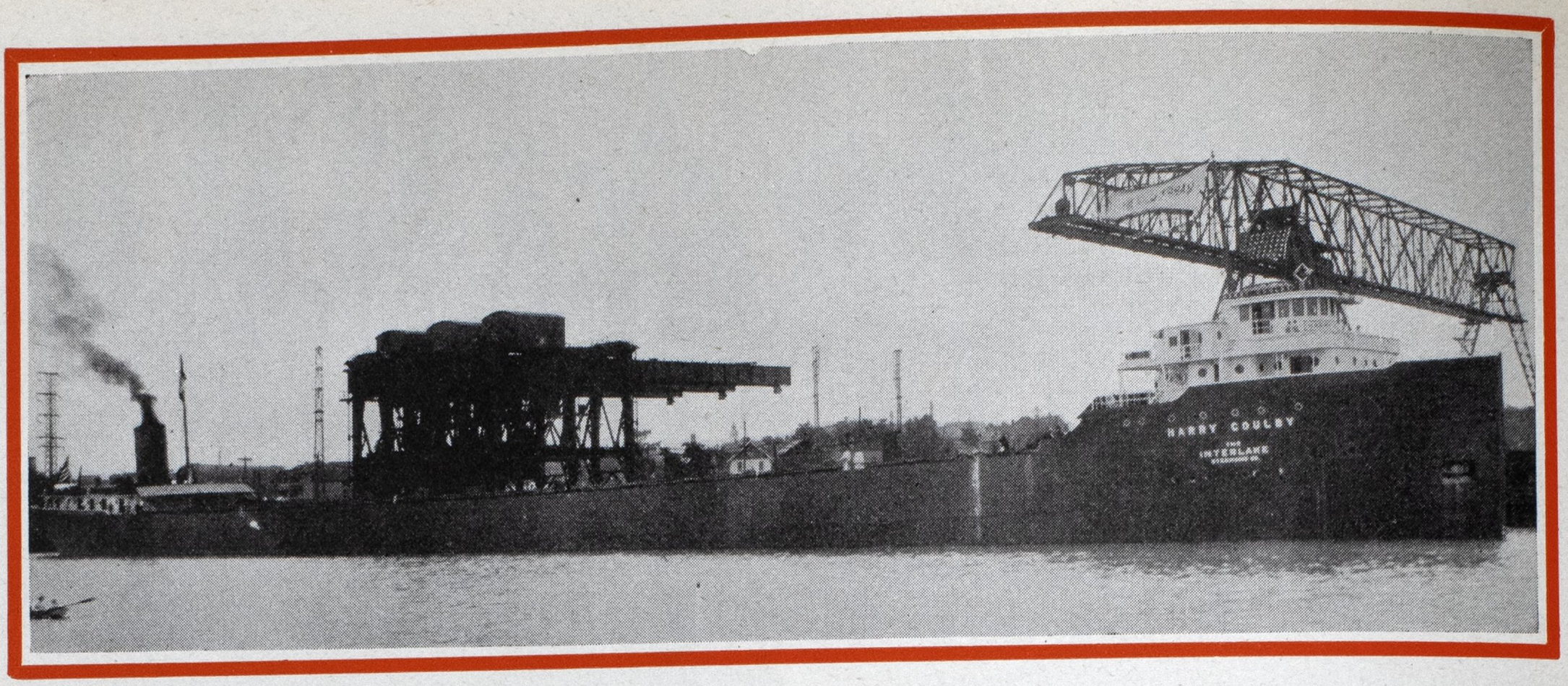


173-7

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY AT 9 P.M., E.S.T. ON A NATION-WIDE N.B.C. NETWORK

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

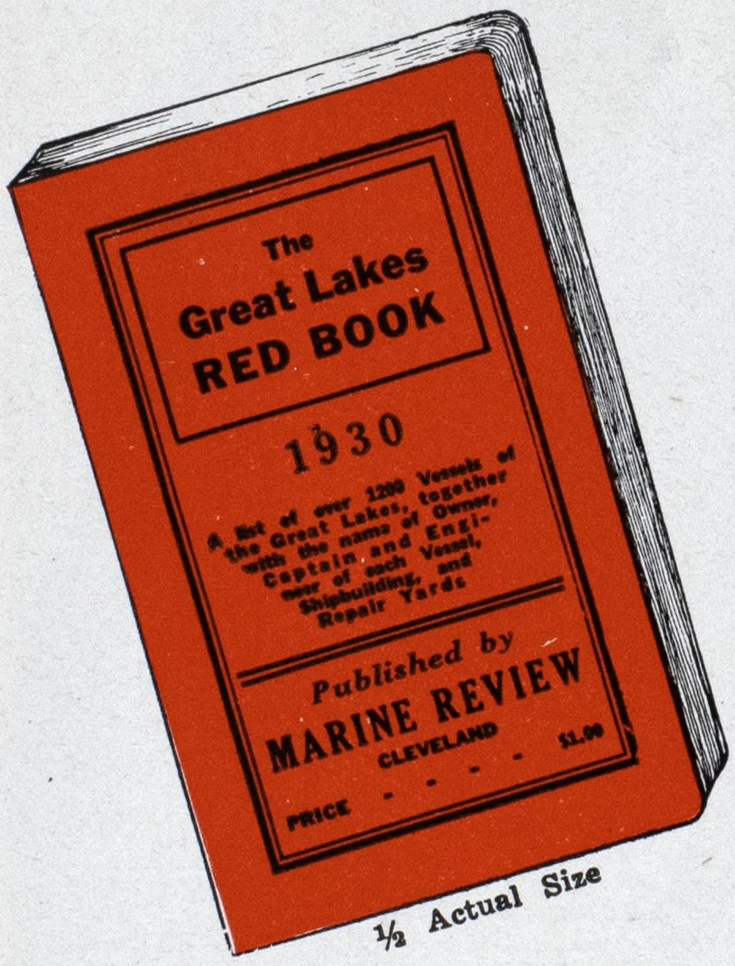


Announcing the–

1930

(27th Annual Edition)

GREAT LAKES RED BOOK



½ Actual Size

1. It has a complete alphabetical index giving the names of lake vessels.
2. It contains a complete, alphabetical list of every vessel owner and operator; name of the master and engineer of each ship; name of every marine superintendent, fleet captain, fleet engineer or other directing heads of each fleet.
3. It gives capacity of the Lake vessel at about 19′ draft,—each ship named in alphabetical order.
4. It contains a complete directory of the shipbuilding and ship repair yards serving shipping on the Great Lakes, with the names of the chief officials of each yard and description of facilities.
5. It has a port directory and classified buyers' guide in which each advertiser is listed geographically and according to product. This also provides an inexpensive means for the advertising of stores and ship chandlers, located at Lake ports, who sell to Lake ships.

Issued just before the start of navigation on the Great Lakes the RED BOOK for 1930 will contain the carefully compiled and up-to-date information about the vessels, and the companies operating them, that has made it for years the most widely used and best known directory on the Great Lakes.

It is convenient, VEST-POCKET size and is used daily by captains, engineers and others aboard ship, and by executives of operating companies.

Business on the Great Lakes is constantly growing. Millions of dollars are spent in the operation and repair of the vessels which comprise the Great Lakes Fleet. The RED BOOK reaches the men who own and operate this vast fleet in a way possible for no other directory.

Space reservations are now being made and the cost is low. We'll gladly give you full details.

GREAT LAKES RED BOOK

Published by **MARINE REVIEW**

PENTON BUILDING

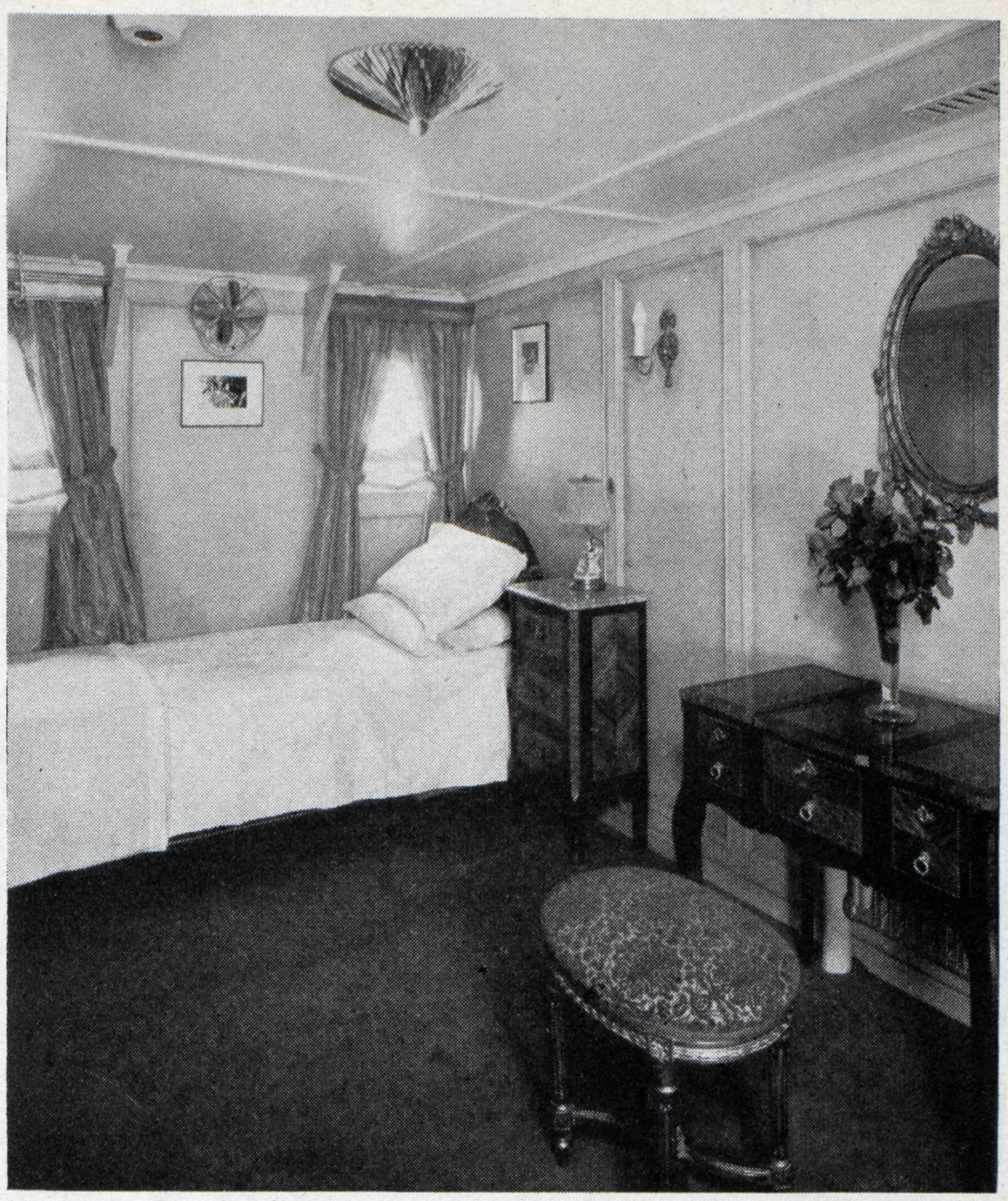
NEW YORK 220 Broadway

CLEVELAND *A.B.C. member A.B.P.*

CHICAGO Peoples Gas Bldg.

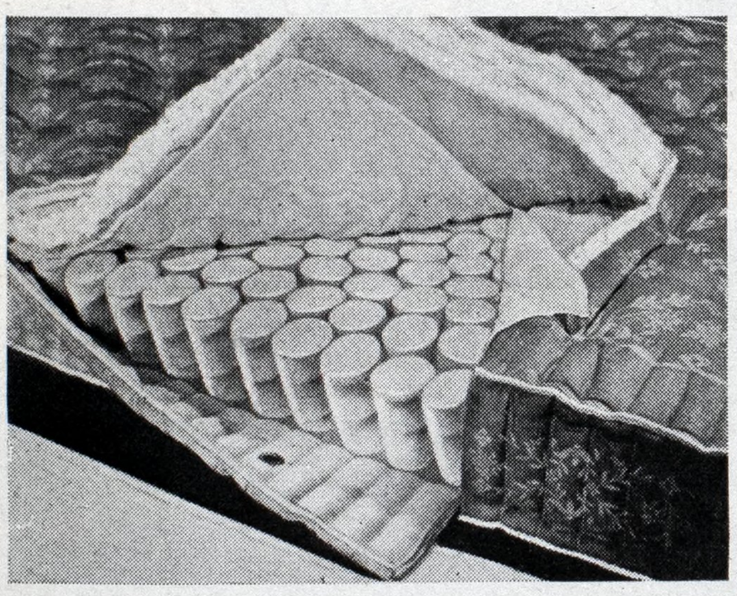
126-M. 127 M.

Catering to the Critical



A typical Dollar Liner stateroom furnished with Simmons Sleep Equipment. Modern in every detail.

The Dollar Steamship Line *again chooses Simmons*



The famous "inner-construction" of the Simmons Beautyrest Mattress. Sturdy, Sanitary, supremely comfortable.

Luxurious surroundings typical of "President" liners attract the type of people who know and demand the best.

WORLD cruise passengers —people of means, refinement and exacting tastes—demand of the steamship lines the degree of luxury and comfort that only the finest equipment afford.

The S. S. President Fillmore, latest of the 'round the world "President Liners"—entirely refitted last December—maintains the Dollar Line standards that have won discriminating travelers' approval.

Now, in every cabin of this finely appointed liner, passengers find the luxury of Simmons Sleep Equipment — Simmons Mattresses and Springs — cabins whose beauty is enhanced by handsome Simmons Metal Beds.

As in the finest hotels and homes, Beautyrest Mattresses—built on the Simmons "inner-construction" principle give the last measure of scientific sleeping comfort no other type of mattress affords.

Low Maintenance Costs

Simmons Sleep Equipment assures low maintenance costs. Beautyrest never "packs down" to become lumpy and sagging. The bed springs are of enduring premier wire of finest grade. The beds of tough steel, superbly finished, are sturdy and enduring.

The Dollar Steamship Line is just one of the many that have chosen Simmons. Before you furnish or refit a liner, check the record of satisfaction Simmons Sleep Equipment has rendered to ship operator and passenger alike.

Simmons

BEDS - SPRINGS - MATTRESSES - METAL FURNITURE AND BERKEY & GAY FURNITURE

RIVER ROUGE PLANT

Foot of Great Lakes Avenue
Telephone Cedar 0011

After 5 P.M. Call

CHARLES E. BAISLEY, Plant Manager
5841 Second Blvd., Detroit, Mich.....Northway 4872

M. W. LACY, Assistant to Plant Manager
326 Chestnut St., Wyandotte, Mich...Wyandotte 374-W

FRANK M. SCOTTEN, Mechanical Engineer
227 Military Rd., Dearborn, Mich.....Dearborn 447

GEORGE CAIN, General Yard Supt.
71 Elm St., River Rouge, Mich.....Cedar 4290-J

JOHN GREIG, Docking Foreman.
110 Walnut St., River Rouge, Mich.....Cedar 5558-W

FRED ERNST, Supt. Machine Shops
6230 Fort St., W., Detroit, Mich .....Cedar 0106

ALLEN TUCKER, Watchman
112 Walnut St., River Rouge, Mich.....Cedar 5245-W

DETROIT PLANT

Foot of Rivard Street
Telephone Randolph 4400

After 5 P.M. Call

ROBERT JACKSON, Plant Manager
2235 Montclair Ave., Detroit, Mich ....Hickory 3551-M

ROY MCDOWELL, Chief Clerk
122 Moy Ave., Windsor, Ont.....Burnside 1837-W

R. PEET, Solicitor
Park Avenue Hotel, Detroit, Mich.....Cadillac 8400

O. WOERFUL, Plant Supt.
2971 Seyburn Ave., Detroit, Mich.....Lincoln 3943-J

ASHTABULA PLANT

Telephone Main 1132

After 5 P.M. Call

F. C. PAHLOW, Plant Manager
568 Main St., Ashtabula, Ohio.....Ashtabula 3192

M. H. PILKINGTON, Chief Clerk
20 Baker St., Ashtabula, Ohio.....Ashtabula 2444-R

E. D. MACKENZIE, Yard Supt.
11 Fargo Ave., Ashtabula, Ohio.....Ashtabula 1652

GEORGE OLDMAN, Master Mechanic
89 State Rd., Ashtabula. Ohio.....Ashtabula 2117-J

CLEVELAND OFFICE

1963 Union Trust Building
Telephone Main 1522

After 5 P.M. Call

JOHN T. WEBSTER.....Fairmount 0849

GREAT LAKES ENGINEERING WORKS

Shipbuilders and Engineers

GENERAL OFFICES

River Rouge, Michigan

Cleveland Office: Union Trust Bldg.

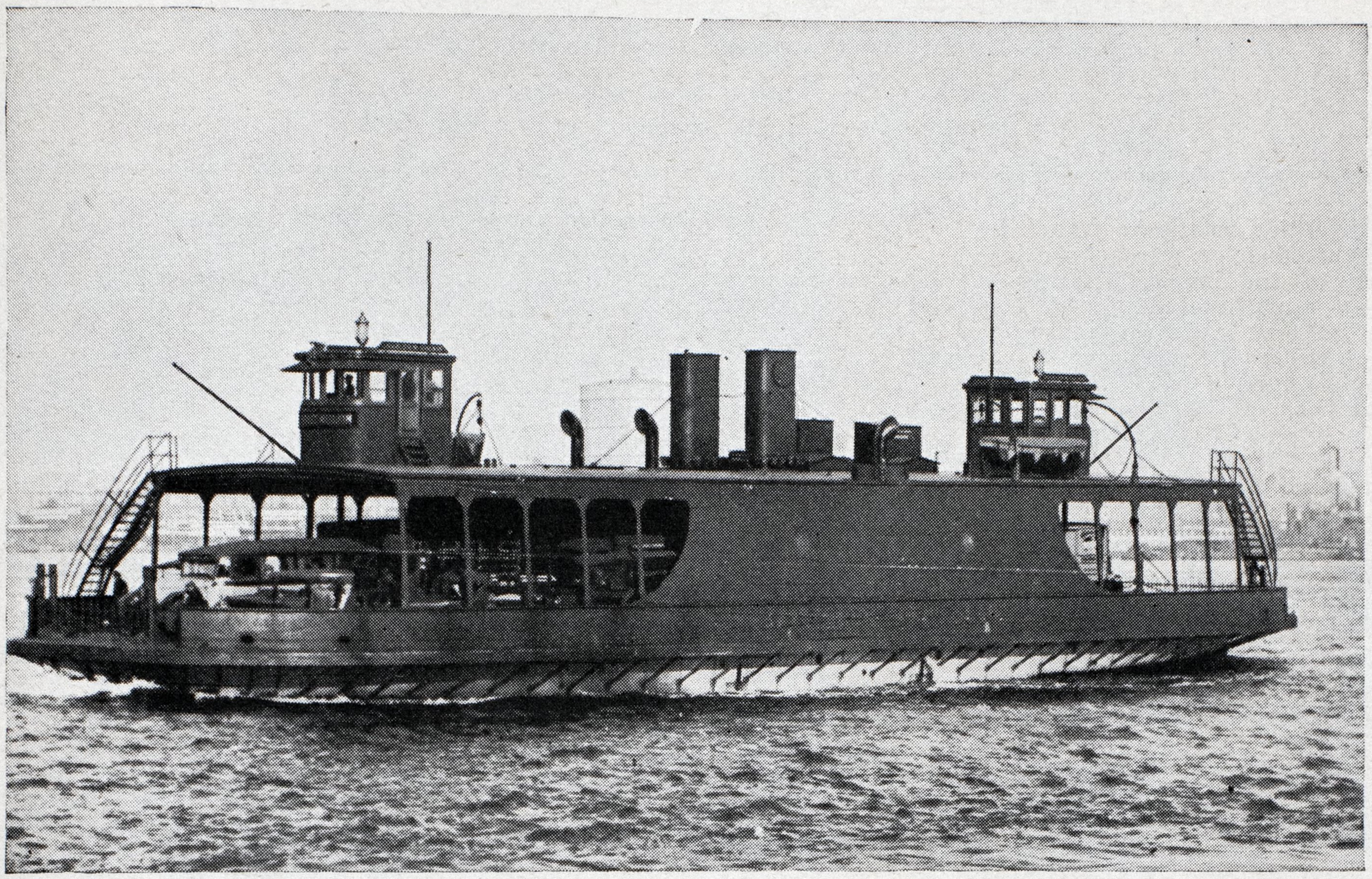
Engine Works Equipped For General Heavy Machine and Foundry Work

Detroit, Michigan

Complete Shipbuilding Dry Dock and Repair Facilities

River Rouge, Mich., and Ashtabula, Ohio

One of the fleet of six motor vehicle ferries operated by Electric Ferries, Inc., New York City. Powered by two six-cylinder, mechanical-injection, Nelseco Diesels, each developing **350 H. P.** *at* **280 R. P. M.**, *which drive two* **240 K.W.**, **250**-*volt, shunt-wound Electro-Dynamic generators, supplying current to a* **580 H. P.** *direct-connected motor.*



300,000 miles without a breakdown!

The six boats of Electric Ferries, Inc., operating across the Hudson River in New York Harbor, have covered a total of 300,000 miles in the three and one-half years of their existence, *without a single halt in schedule due to mechanical trouble.* The economy in fuel is of course outstanding. . . . Only *five* men are required for the entire crew.

A complete survey conducted by the owners after three years of service showed that all of the original working parts, such as cylinder heads, pistons, valves, liners, bearings, etc., were in first-class condition with only a minimum of wear. . . . One-man pilot house control is used on these Nelseco Diesel electric ferries permitting instant maneuvering in heavy river traffic or fog.

Total operating costs are less than $6 per hour per boat, as compared with an approximate cost of $18 per hour for corresponding steam-driven boats.

The economy, reliability and flexibility of Nelseco Diesels have solved many marine profit-making problems. We shall be glad to send you complete information. Write for Catalog MR.

ELECTRIC BOAT COMPANY

New London Ship and Engine Works, Groton, Conn., U. S. A.

NELSECO

New York Sales Office: **247 Park Avenue, New York City.** ***Original licensees from and collaborators with M. A. N. since*** **1910**

Chicago Representative
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25 North Dearborn Street
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10 High Street
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West Coast Representative
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Los Angeles

Memphis Representative
J. S. Bronson
1348 Madison Avenue
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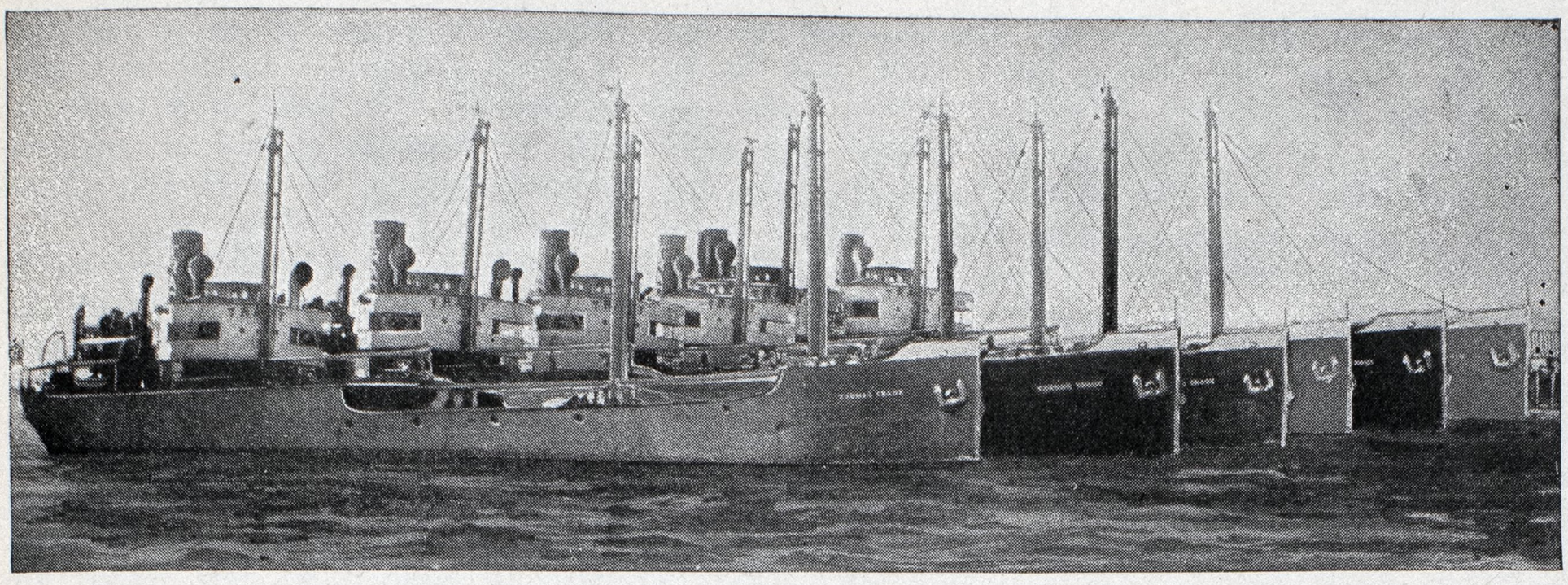
A FLEET OF SIX



TEXACO LUBRICATED

▲▲ These six colliers were built in 1918 by the Great Lakes Engineering Company and are owned and operated by the M. & J. Tracy Company of New York. They are powered by 1300 h.p. triple expansion engines and lubricated by Texaco.

▲▲ Texaco Lubricants were selected because of their known high quality and dependability. Years of service has proved the wisdom of this choice. It is another example of the effective lubrication provided by Texaco Lubricants and Texaco engineering cooperation.

▲▲ There is a Texaco Lubricant for every purpose aboard ship. Whether on inland waterways, on coastwise routes or in foreign ports, Texaco Lubricants are always conveniently available. The Texaco Red Star with the Green T is a symbol of quality. Call up The Texas Company first for lubrication service.

The Texas Company—Marine Sales Division—17 Battery Place, New York City

Offices in Principal Cities

TEXACO LUBRICANTS

When the "Line" Goes On

WHEN a Moran line goes on a vessel either entering or leaving the Port of New York, the three-generation Experience of Moran is behind the operation—with its attendant outstanding equipment, facilities and personnel.

More than the actual "line" —more than the actual number of men and tugs employed— is the *Plus* of Moran Dependability to operator, underwriter and general public alike.

OVER SIXTY-EIGHT YEARS IN SERVICE

Day and Night Service Every Day and Night in the Year.

MORAN TOWING AND TRANSPORTATION COMPANY, INC.

17 Battery Place, New York—Whitehall 1340

MORAN Service

"Yes, mass production methods can be applied to marine freight handling"

CAREFUL studies have shown that mass production methods of handling, depend for their success—not so much on a large number of identical loads as on the adaption of a *standard method*, which means simply—"the one best way of performing the job." When found, the one best way makes unit savings on small tonnage approximately equal to unit savings on large tonnage.

As this fact becomes more widely appreciated among marine terminal executives, Elwell-Parker Electric Trucks are being rapidly adopted to furnish the *standard method* of handling freight. At the Pacific Coast terminal pictured above, bales of cotton were formerly trucked by hand in a haphazard manner from freight cars to warehouse . . . and from warehouse to ship-side. One man handled one bale per trip.

COST OF HANDLING COTTON REDUCED OVER 88%

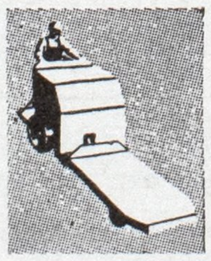
Today, an Elwell-Parker Electric Truck, controlled by one man, tows four trailers, each loaded with three or four bales, to the ship-side. In checking the performance of the truck it was found that 25 tons of cotton could be handled direct from car to ship at a cost of 5c per ton. When trucked by hand, the same tonnage cost 75c per ton.

On an Elwell-Parker Tructor, the power can be applied to the wheels before brake is released. A fully loaded Tructor can thus be stopped and started on a ramp without danger of slipping back. Your safety committee will appreciate the importance of this advantage.

Perhaps an Elwell-Parker Engineer can assist you in applying mass production methods at your terminal. He offers you a wide and varied experience covering industrial handling problems as well as marine freight. His experience and suggestions are available to you without charge or obligation. Give him a call, or if you prefer, write direct to Elwell-Parker in Cleveland.

The Elwell-Parker Electric Company

DESIGNERS AND BUILDERS OF ELECTRIC INDUSTRIAL TRUCKS, TRACTORS AND CRANES FOR 24 YEARS



SHIP ON SKIDS

4200 St. Clair Ave., Cleveland

TRUCTORS

UP AGAIN
goes the LIFE *of* EXIDE
Ironclad batteries

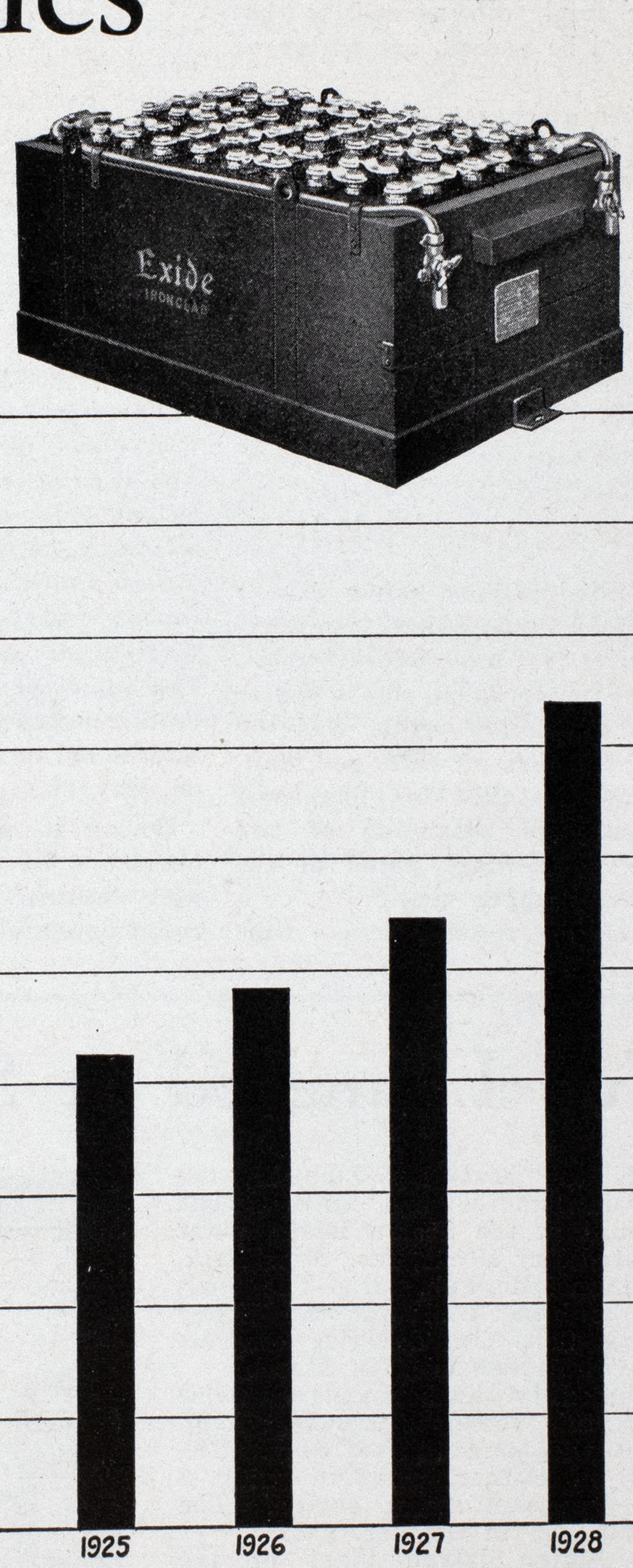
THE average life of Exide-Ironclad industrial truck batteries renewed during the year 1929, again showed an increase over the highest previous year's record.

Constant improvements in design and construction have resulted in an increase in the service life delivered by Exide-Ironclad Batteries for six consecutive years, and a total increase of 42.4% over the period. (Based on actual service records of batteries renewed.)

This means more battery for the money, and lower battery costs, as this increased life and greater durability have been obtained at no increase in prices.

Such improvement in any product merits consideration. When you next need a battery, buy an Exide-Ironclad.

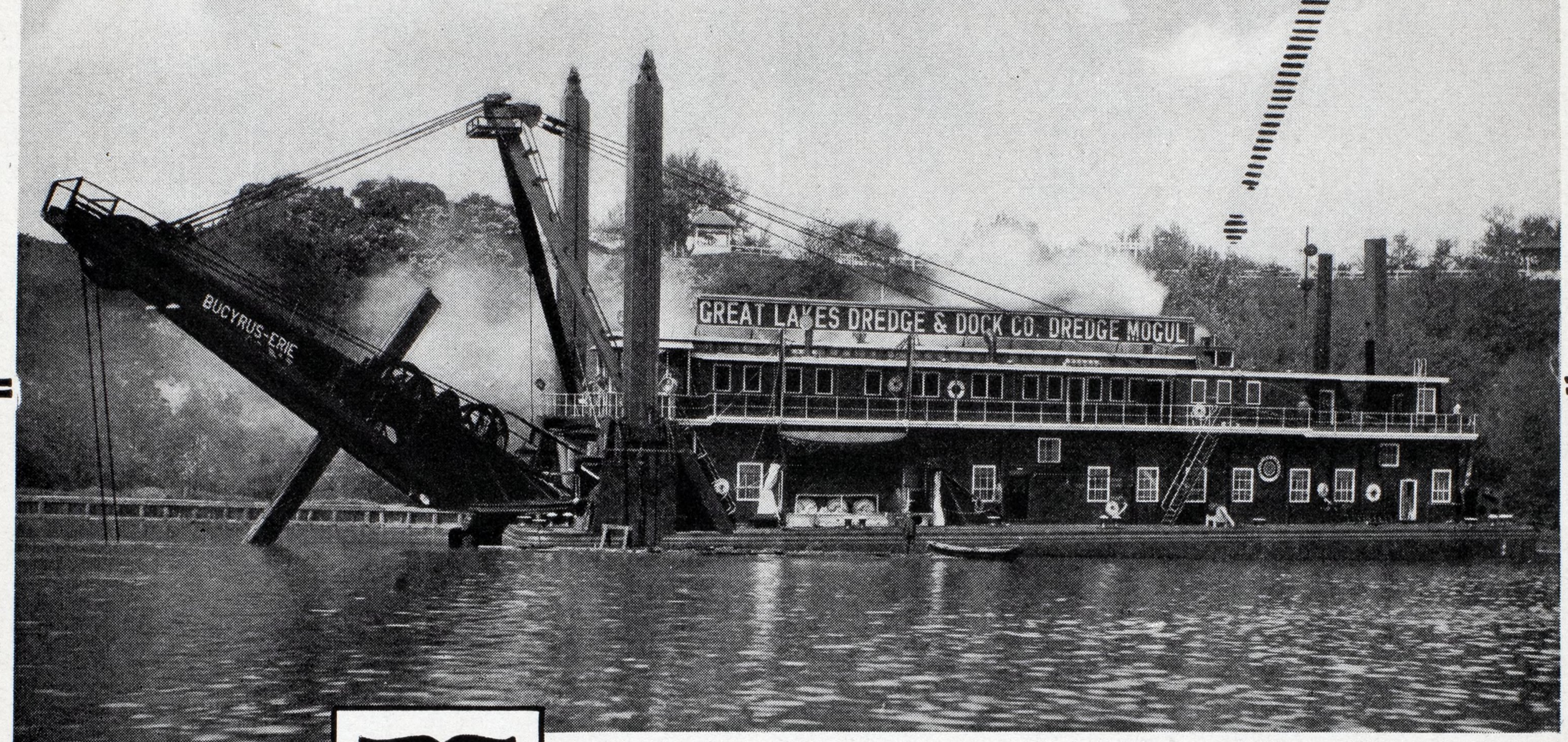
Exide
IRONCLAD
BATTERIES



A 42.4% INCREASE IN LIFE IN SIX YEARS!
This chart shows how constant improvements in construction have resulted in a steadily increased life in Exide-Ironclad Batteries

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE
Exide Batteries of Canada, Limited, Toronto

Another MANITOWOC PRODUCT



THE 8 cu. yd. Diesel Electric Dipper Dredge MOGUL was built for Great Lakes Dredge & Dock Co., Chicago. It is equipped with a 12 cu. yd. dipper for ordinary work but will heap up to a load of 16 yards in lighter materials. An 8 cu. yd. dipper is used for dredging rock. Maximum digging depth is 42 ft. of water. The MOGUL is 156′0″ x 42′6″ x 12′8″—1200 H.P., equipped with Bucyrus-Erie dredging machinery and Busch Sulzer Diesel engine. It has living quarters for a crew of twenty-three men.

It will pay you to consult Manitowoc when in the market for dredges, steel passenger and freight vessels, carferries, tankers, fire boats, sand suckers, tugs, scows, lighters, marine engines, marine boilers, ship auxiliary equipment, etc.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wisconsin

Three Ingersoll-Rand Diesel Auxiliaries on the M. S. City of New York

Three I-R 335-hp. solid-injection Diesel engines, direct-connected to generators, are installed on the M. S. City of New York. They supply power for all auxiliary purposes.

This is the latest in engine-room design—a practice that makes for the utmost in economy and efficiency on either motorship or steamship.

INGERSOLL-RAND COMPANY - 11 Broadway - New York City

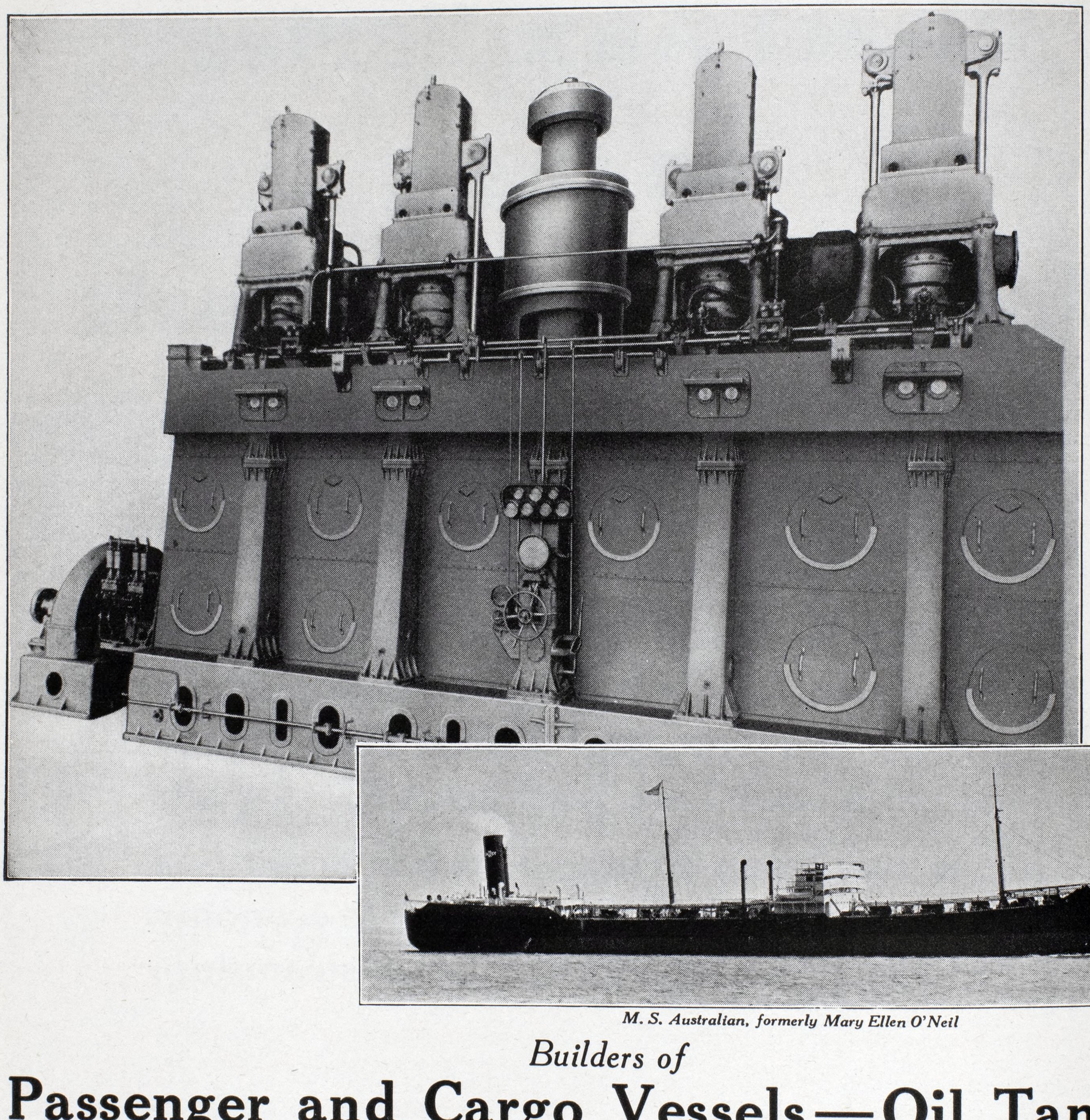
Branches or distributors in principal cities the world over

For Canada refer—Canadian Ingersoll-Rand Co., Limited, 10 Phillips Square, Montreal, Quebec

Ingersoll-Rand 84-MOE

SUN-DOXFORD
OPPOSED-PISTON
DIESEL ENGINES

Power with Efficiency



M. S. Australian, formerly Mary Ellen O'Neil

Builders of

Passenger and Cargo Vessels—Oil Tankers

unlimited facilities for

MARINE REPAIRS

Two floating Dry Docks—11,000 Tons Lifting Capacity Each

SUN SHIPBUILDING & DRY DOCK CO.

Shipyard & Main Office
CHESTER, PA.

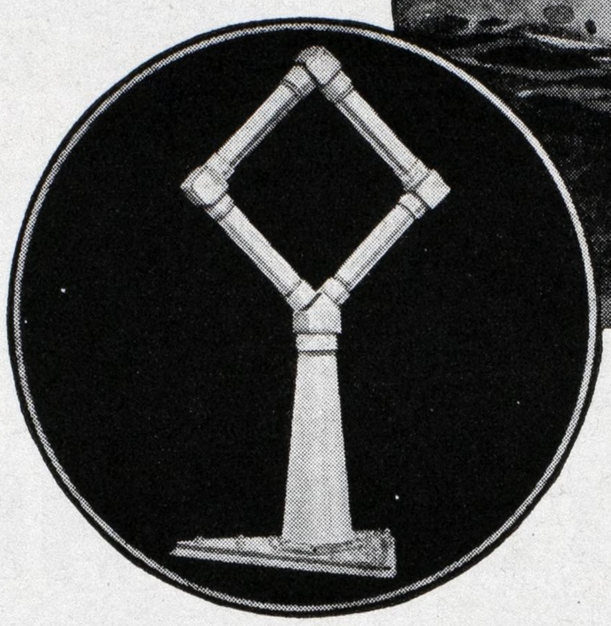
25 Broadway
NEW YORK

One of the modern miracles

OF NAVIGATION

THE RCA

RADIO DIRECTION FINDER



Entire fleets owned and operated by large steamship companies are now equipped with the RCA Radio Direction Finders ... New protection and added safety for hundreds of ships are thus assured because they are provided with this remarkable device.

The RCA Radio Direction Finder is furnished and serviced by the Radiomarine Corporation of America.

Unsurpassed in efficiency, this progressive organization enjoys the benefits of vast research, engineering and manufacturing facilities. It also maintains the world's greatest system for ship to shore communications, enabling owners and agents to keep in constant touch with their vessels.

Ship owners and navigators all declare the RCA Radio Direction Finder is the greatest single contribution towards safety at sea. It efficiently combats every storm condition . . . rain, fog, snow, sleet or wind.

Complete RCA Service includes

1. *Equipment*—transmitting and receiving equipment of the vacuum tube type; radio direction finder.
2. *Service on equipment*—regular inspections at any of seventeen ports; maintaining at principal ports stocks of spare parts for repairs and renewals.
3. *Operators*—detailing of experienced operator personnel to the ships.
4. *Coastal stations*—Maintenance of fifteen coastal stations on the Atlantic, Pacific, Gulf and Lakes, for prompt, efficient handling of radio traffic.
5. *Accounting*—Checking and settling of accounts.
6. *Licenses*—Procuring of government licenses.

Radiomarine coastal stations are located at the following points:

Chatham, Mass.	Baltimore, Md. (city station)	Cleveland, Ohio
New London, Conn.	Palm Beach, Fla.	Chicago, Ill.
East Moriches, L. I.	Galveston, Tex.	Duluth, Minn.
New York, N. Y.	Port Arthur, Tex.	Los Angeles, Cal.
Tuckerton, N. J.	Buffalo, N. Y.	San Francisco, Cal.

Radiomarine storerooms and service stations in charge of radio men of long experience are located at the following ports:

Boston	Norfolk	Port Arthur	Duluth
New York	Savannah	Buffalo	Los Angeles
Philadelphia	New Orleans	Cleveland	San Francisco
Baltimore	Galveston	Chicago	Seattle
		Honolulu	

RADIOMARINE CORPORATION
OF AMERICA
66 BROAD STREET
NEW YORK

A subsidiary of the Radio Corporation of America

SS "STADACONA"

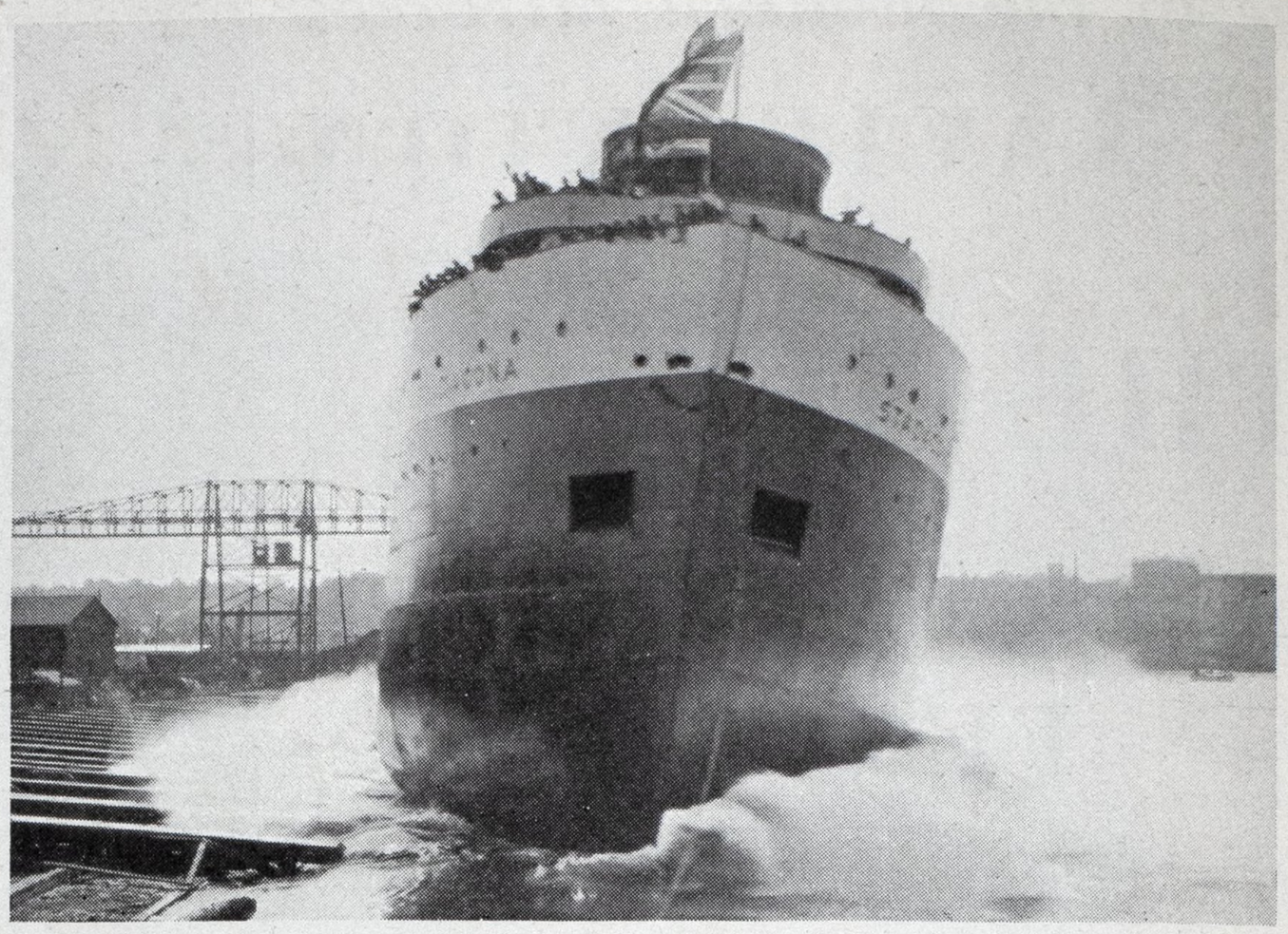
Latest Bulk Freighter

of the Canada Steamship Lines fleet

was built by the

Midland Shipbuilding Co.

Midland, Ontario



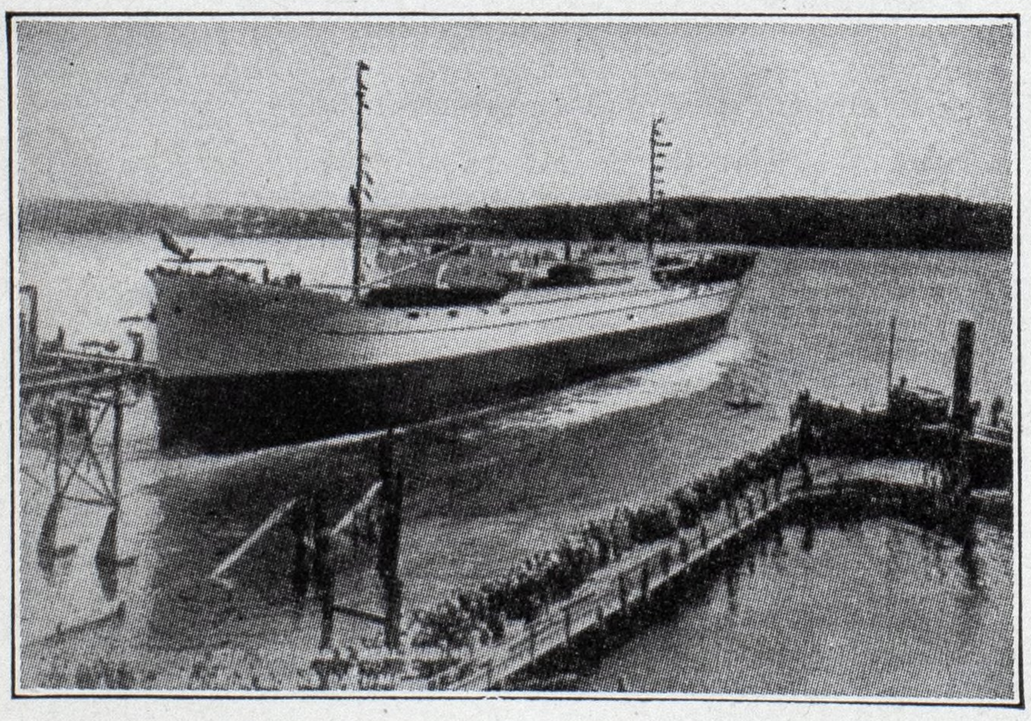
The Stadacona will go into operation during the Season of 1930.

The Midland Shipbuilding Company is owned by

CANADA STEAMSHIP LINES

BATH IRON WORKS

Launching 425 ft. steel Steamship



Years of experience in design and building water craft, have won for Bath Iron Works an enviable reputation. Sound materials straight thru, expert designing, conscientious workmanship—these are features of every vessel that leaves the docks of the Bath Iron Works.

Inquiries Solicited

BATH IRON WORKS CORP.

SHIPBUILDERS AND ENGINEERS

BATH, MAINE, U.S.A.

LOS ANGELES

SHIPBUILDING & DRYDOCK CORPORATION

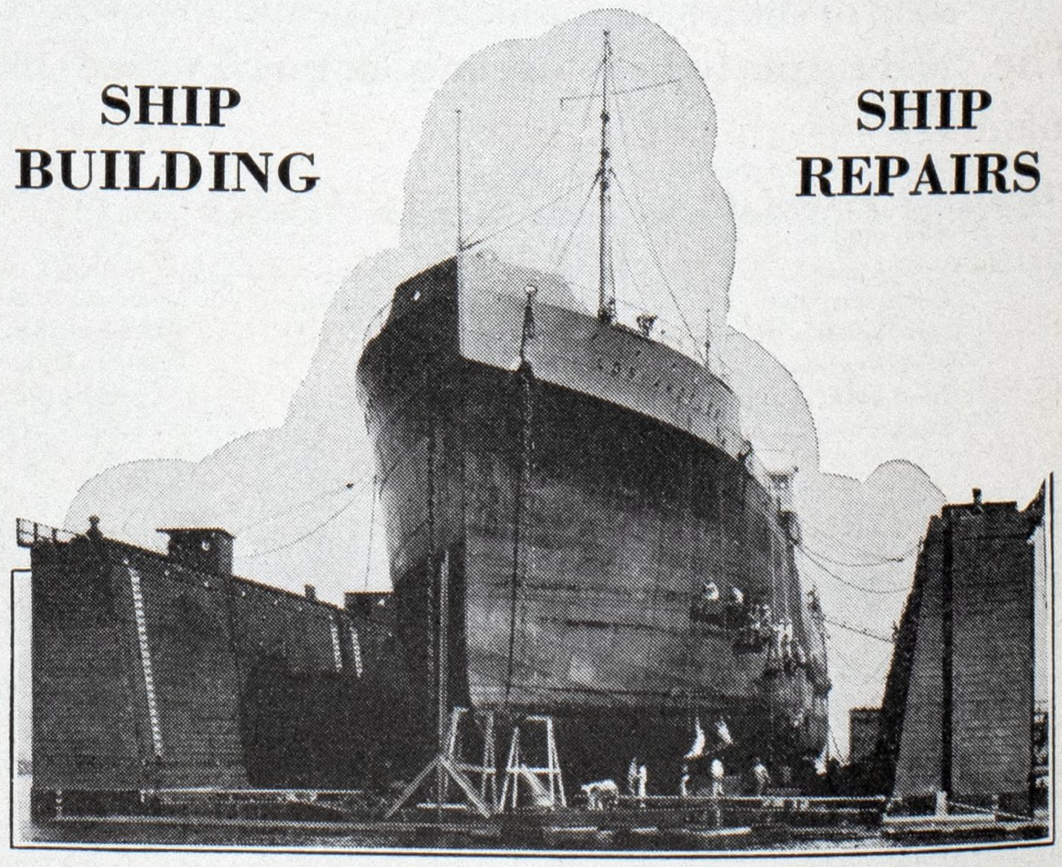
SAN PEDRO, CALIFORNIA

40 Acres of Modern Shipbuilding Equipment To Meet Every Requirement

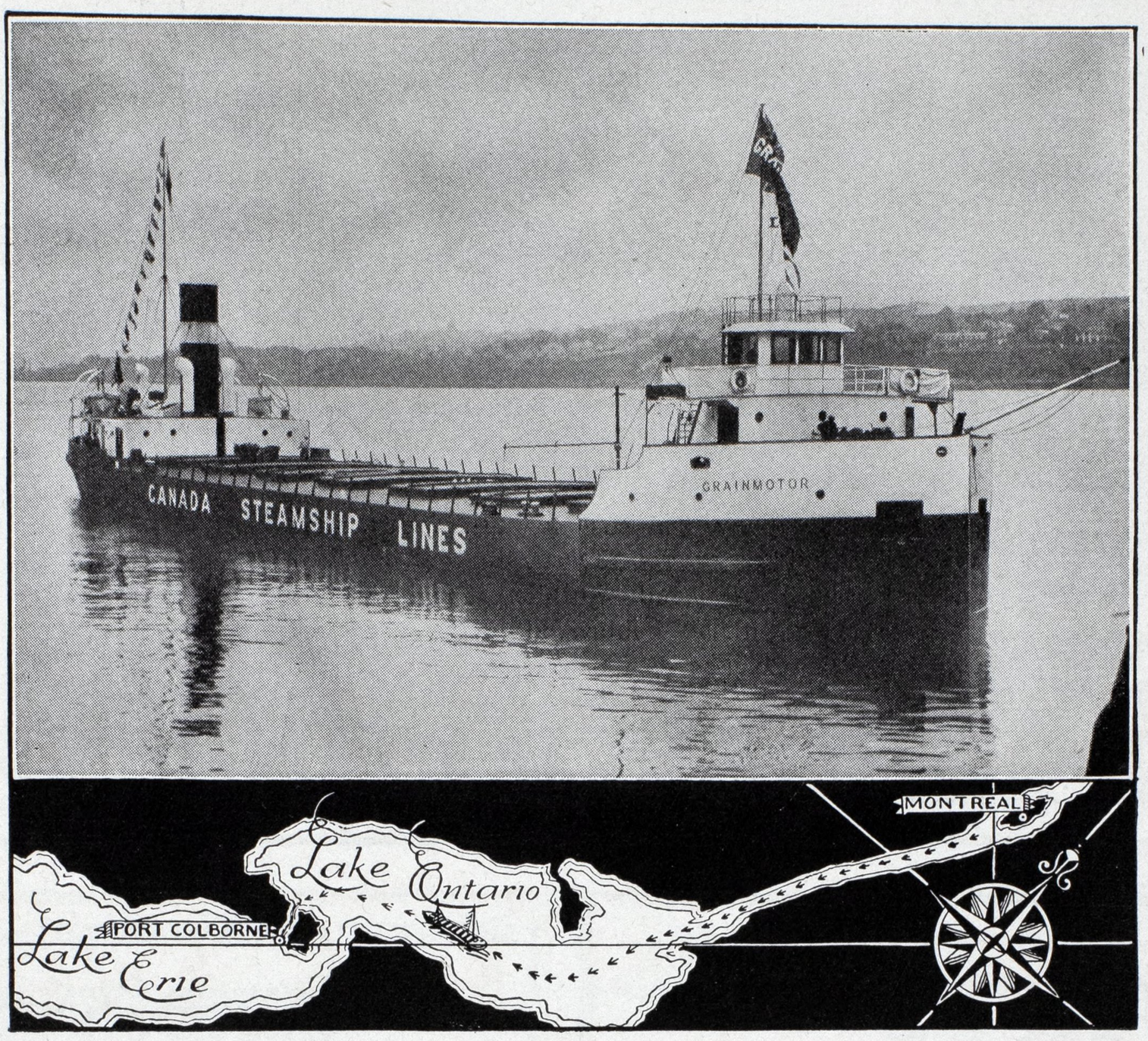
Floating Drydock—12,000 Tons Capacity

SHIP BUILDING

SHIP REPAIRS



Cooper-Bessemer Diesel Power Sets a New Standard in Canal Carriers



FROM HER TRIAL run the "Grainmotor" was destined to be a signal success. Her performance on her trips from Montreal to Port Colborne and return has ushered in a new era in canal cargo carriers and again demonstrated the wonderful performance qualities of Cooper-Bessemer Diesel Engines.

The "Grainmotor's" engine room log of her maiden trip shows that the Cooper-Bessemer engine answered 1,587 signals without a single failure to carry out a signal—and turned over at only 32 R. P. M. dead slow, a remarkable tribute to the reliability and maneuverability of the power plant. Her oil consumption for the round trip was approximately 3,000 gallons. On 22 trips a year, which is the average for ships in this service, this means a total fuel and lubricating oil bill of only $5,000.00 a year—representing an annual saving of from $5,000.00 to $7,000.00 over a similar steam driven vessel. And in addition, the services of three firemen were dispensed with and a carrying capacity at least 5,000 bushels in excess of the largest capacity steam-driven grain bulk canal carrier!

Truly, the "Grainmotor" sets a new standard for canal carriers and furnishes still another outstanding example of the serviceability, reliability and economy of Cooper-Bessemer Diesel Engines.

THE COOPER-BESSEMER CORPORATION

General Diesel Sales Offices:

SUITE 301, 25 WEST 43rd STREET, NEW YORK CITY

Plants: GROVE CITY, PA. · MT. VERNON, OHIO

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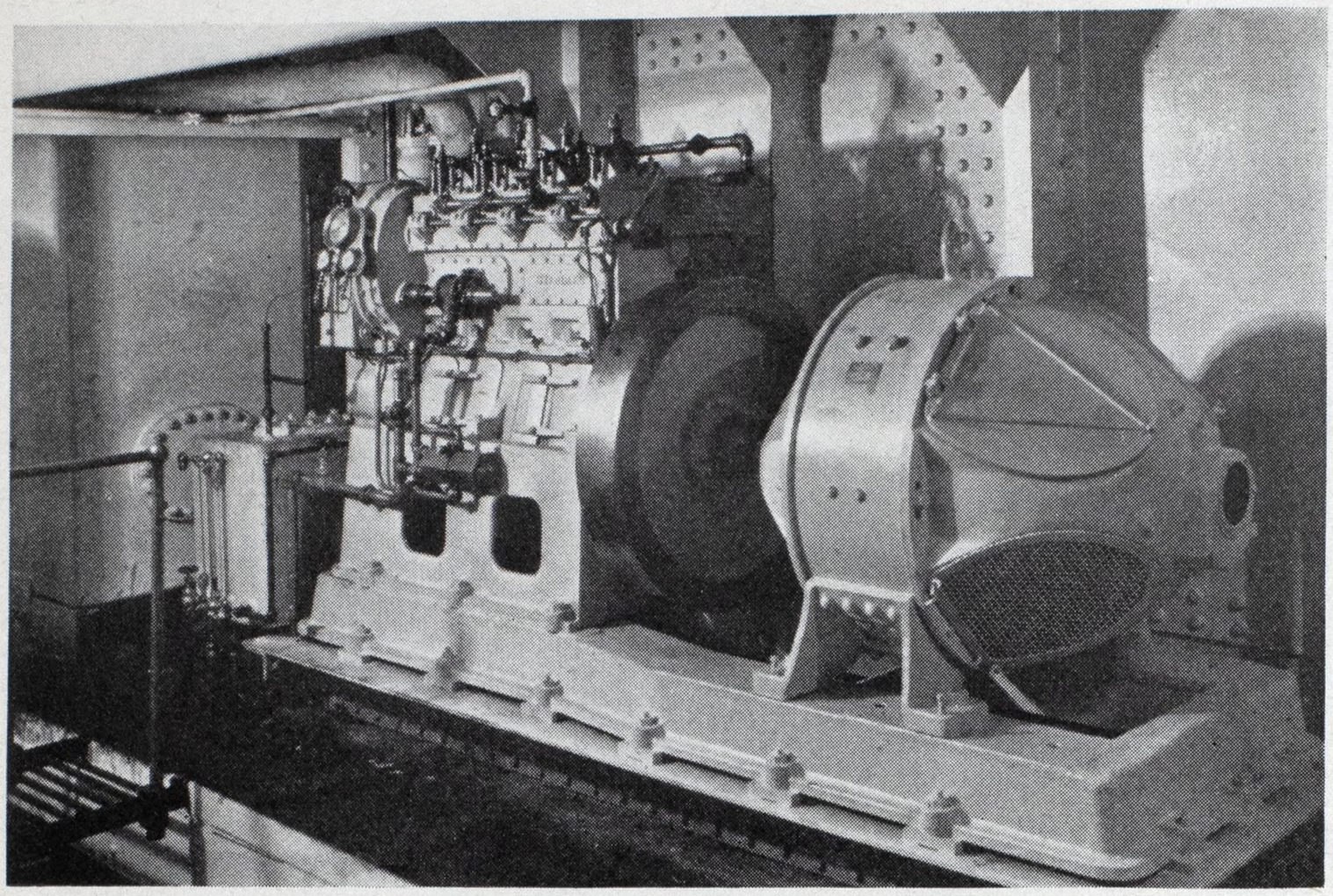
COOPER-BESSEMER

DIESEL MARINE ENGINES

SAVING MONEY? Start Right Now



20 K. W. Emergency Set on American-South African Line Motorship "City of New York".

By Installing Our Diesel Engine Driven Generating Sets.

They Operate On Heavy Cheap Oil and Deliver Dependable Smooth Power at Low Cost.

It Will Pay You To Get Our Quotation.

STANDARD MOTOR CONSTRUCTION COMPANY

184 Whiton St. Jersey City, N. J.

DIESEL GENERATING SETS

BEAUTIFUL AND COMFORTABLE

The S. S. Pennsylvania sailed on her maiden trip with 800 passengers, who, during the voyage, enjoyed the comfort of M & S Chairs.

—All future passengers on the Pennsylvania, as well as the S. S. California and S. S. Virginia, will enjoy the dignity and beauty of *"Chairs Designed for Comfort and Built to Last."*

There are just such chairs for every mariner's purpose.

We invite your correspondence.

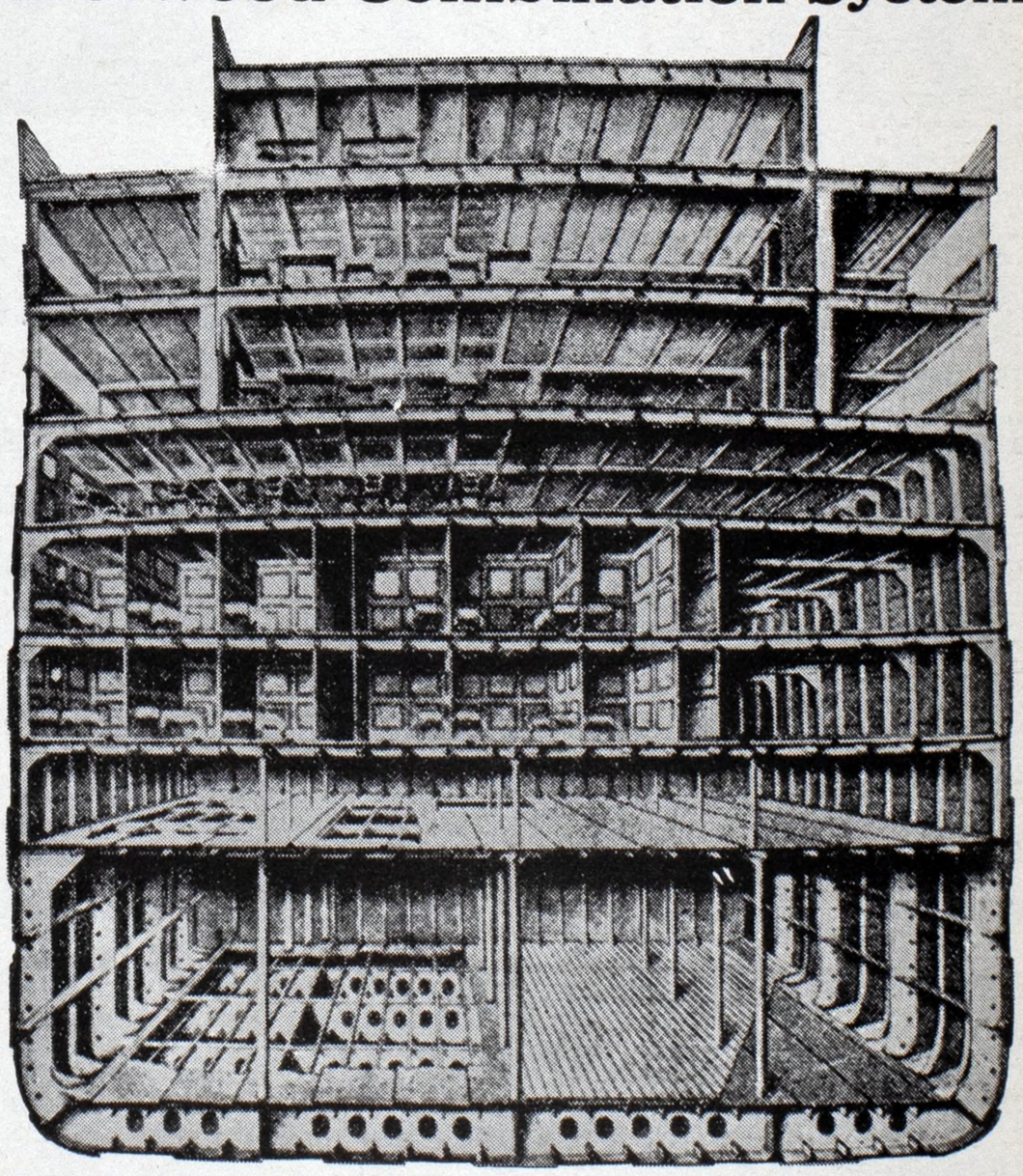
THE MARBLE & SHATTUCK CHAIR CO.

"Makers of Fine Chairs"

Cleveland, Ohio

New York Office—152 West 42 St.—Tel. Wisconsin 2321

Isherwood Combination System



Sectional View of Interior of Passenger Liner designed on the Isherwood Combination System

(In a vessel of this type, deep transverses are recommended for hold construction, but are not essential.)

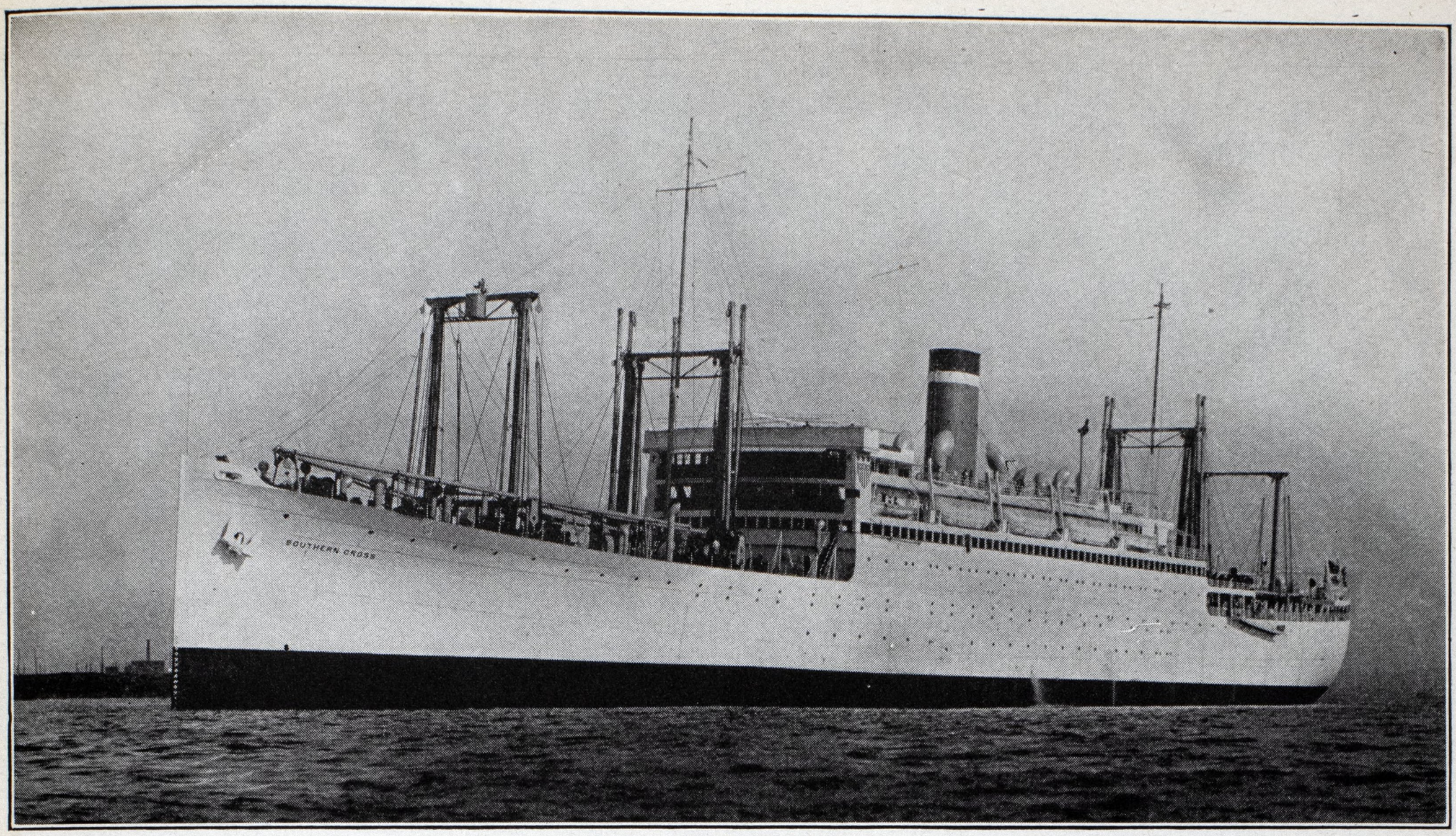
Adaptable to any type but particularly advantageous for passenger liners.

Shipowners are advised to specify that plans and structural arrangements should be approved by

SIR JOSEPH W. ISHERWOOD & CO., Ltd.

17 BATTERY PLACE, NEW YORK
and 4, LLOYD'S AVENUE, LONDON, E. C. 3

2



T. S. S. SOUTHERN CROSS

Length, 535 feet; beam, 72 feet; depth, 50 feet; displacement, 21,167 tons; gross, 14,100 tons. Speed, 17½ knots. Passenger capacity: First class, 260; third class, 300.

Passenger-Cargo Vessels *built by*

NEW YORK SHIPBUILDING COMPANY

Total Gross Tonnage: 291,727 - *Total Horsepower:* 235,715

NAME	PRESENT OWNER
T. S. S. MONGOLIA	Dollar Steamship Company
T. S. S. MANCHURIA	Dollar Steamship Company
S. S. ONTARIO	Merchants & Miners Trans. Co.
S. S. DOROTHY ALEXANDER (ex-President)	Pacific S. S. Company
S. S. GOVERNOR	Sunk in 1921
S. S. CITY OF ATLANTA (ex-Columbia)	Chesapeake S. S. Company
S. S. CITY OF ROME (ex-Suwanee)	Merchants & Miners Trans. Co.
S. S. CITY OF SAVANNAH (ex-Somerset)	Ocean Steamship Company
T. S. S. EMMA ALEXANDER (ex-Nanking—ex-Congress)	Pacific S. S. Company
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T. S. S. PRESIDENT HAYES	Dollar Steamship Company
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T. S. S. PRESIDENT McKINLEY	Dollar Steamship Company
T. S. S. PRESIDENT ROOSEVELT	Dollar Steamship Company
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NEW YORK SHIPBUILDING CO.

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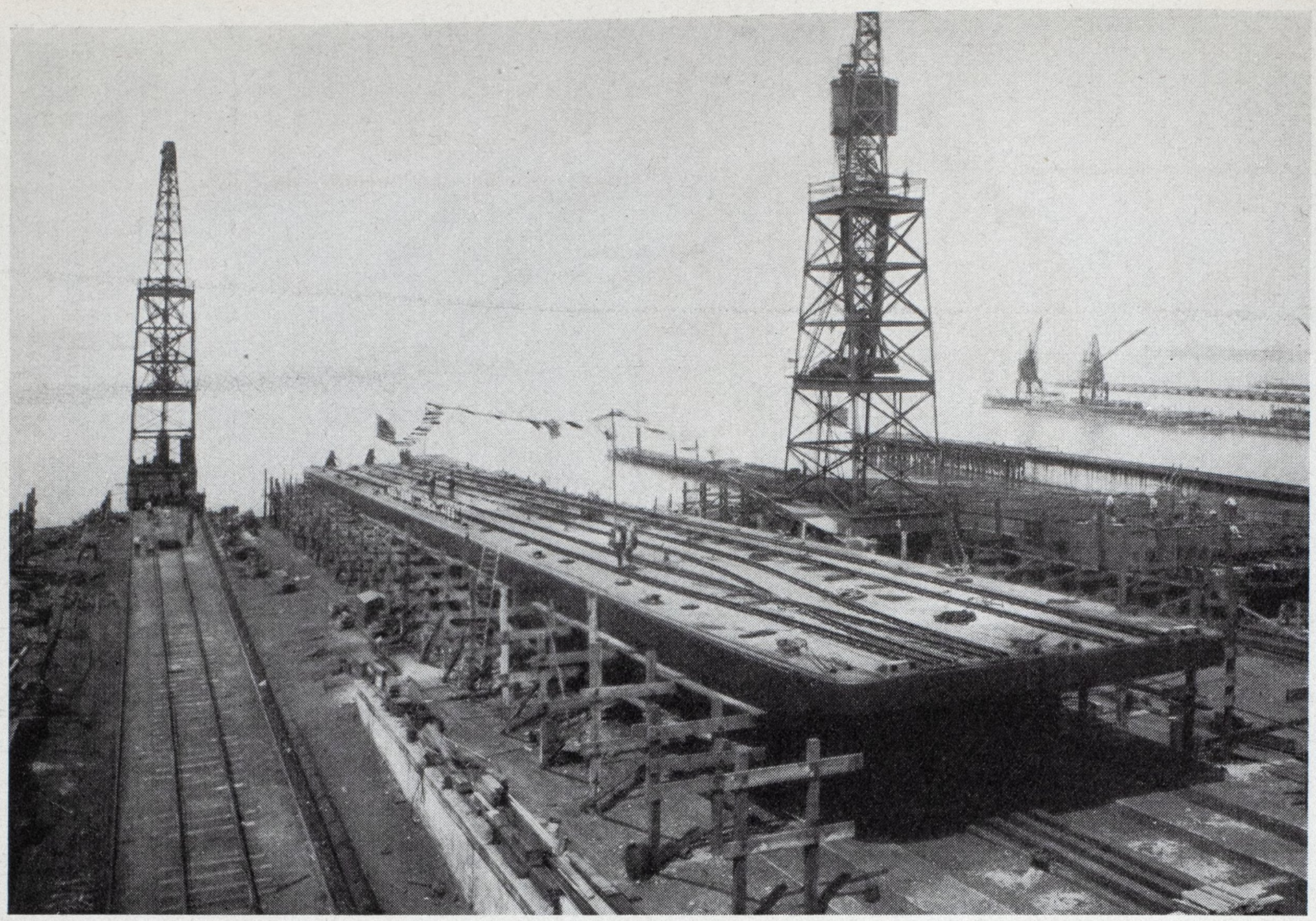
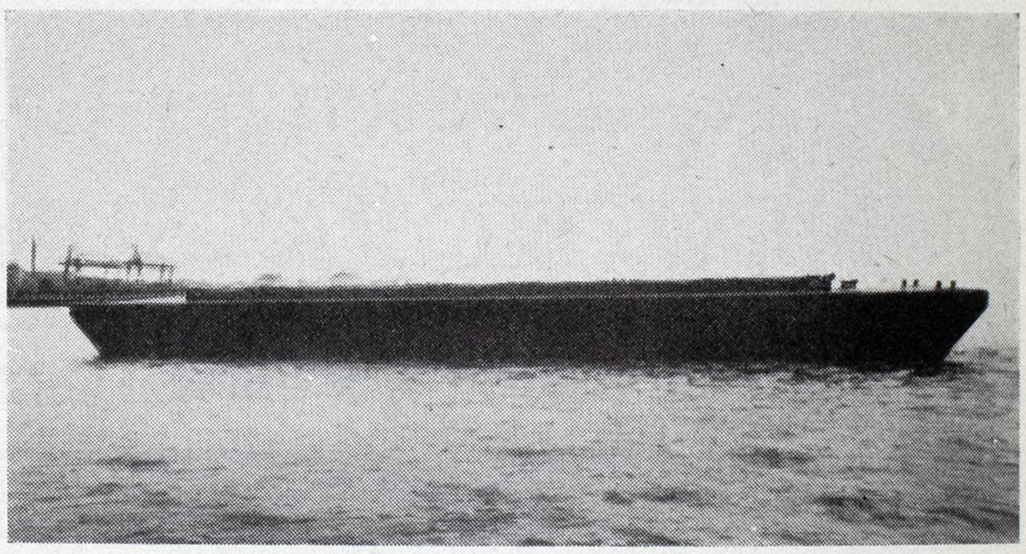


Left: *Three-track steel car-float built for the Erie Railroad Company. Dimensions 325′ 0″ x 38′ 6″ x 10′ 6″.*

Below: *One of eight 1,000 cubic-yard steel dump scows built at Sparrows Point Works for the Arundel Corporation.*



A plant specializing in the construction of—barges—car-floats—scows

During 1929 the Sparrows Point Works of Bethlehem's Baltimore Plant delivered 10 car-floats, 2 barges, and 8 steel dump scows. Sparrows Point Works specializes in this class of construction.

Ideally situated, adjacent to Bethlehem's steel mills, with 10 building slips available for construction, Sparrows Point Works is in a position to make quick deliveries at low cost.

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BETHLEHEM, PA.

General Sales Offices:

Atlantic Coast: New York: 25 Broadway **Pacific Coast: San Francisco: 20th and Illinois Sts.**
District Offices: Boston, Baltimore and San Pedro

BETHLEHEM

Allied with a great industry

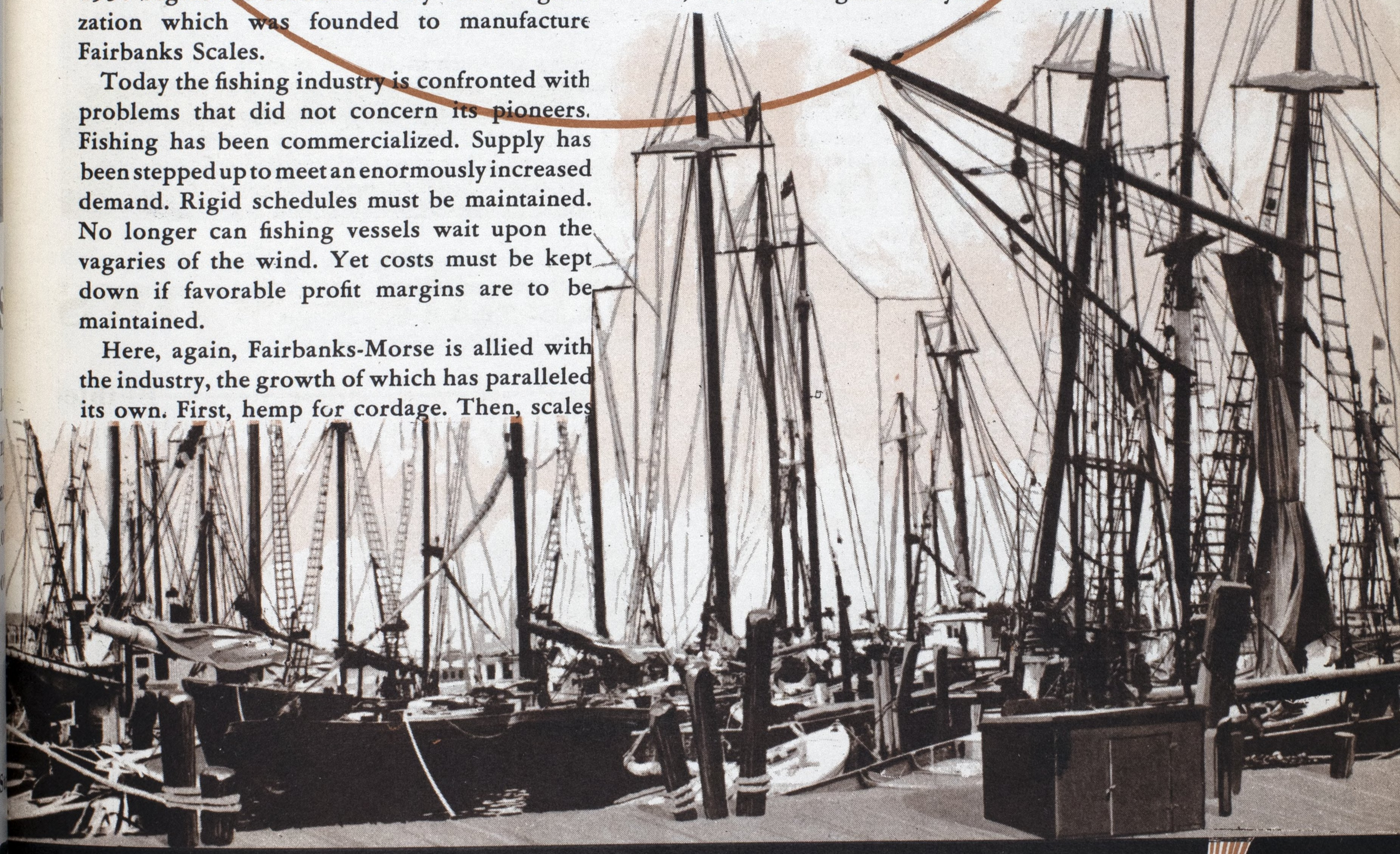
New vessels! New rigging! New nets! These were the demands of New England fishermen when the waters of the Atlantic had calmed after the War of 1812. The fishing industry had begun to grow. Yet only recently has this great industry demonstrated its unlimited possibilities as a result of improved refrigeration and fast transportation.

Identified with the fishing industry more than a century ago was a hemp dealer in St. Johnsbury, Vermont. Thaddeus Fairbanks sold hemp that was made into the cordage used by those pioneer fishermen. It was while engaged in this business that Thaddeus Fairbanks—impatient with the crude weighing devices of his time—conceived the system of weights and levers which is the foundation of every modern scale. 1930 begins the Second Century of the organization which was founded to manufacture Fairbanks Scales.

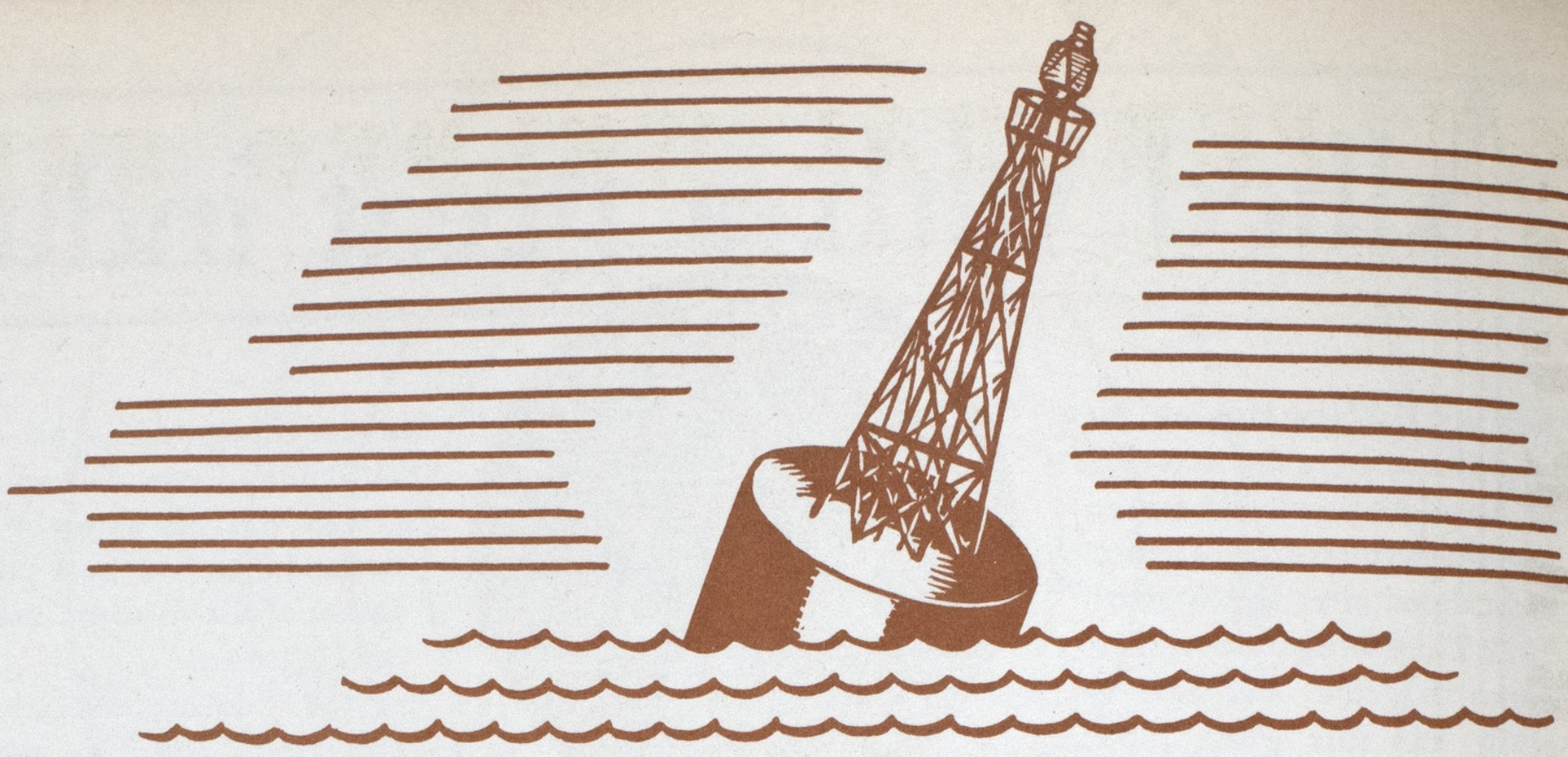
Today the fishing industry is confronted with problems that did not concern its pioneers. Fishing has been commercialized. Supply has been stepped up to meet an enormously increased demand. Rigid schedules must be maintained. No longer can fishing vessels wait upon the vagaries of the wind. Yet costs must be kept down if favorable profit margins are to be maintained.

Here, again, Fairbanks-Morse is allied with the industry, the growth of which has paralleled its own. First, hemp for cordage. Then, scales for weighing fish. And now Fairbanks-Morse Diesel Engines which supply the dependable, low cost power essential for modern fishing vessels.

On the Atlantic and on the Pacific, vessel and fleet owners are turning to F-M Diesels for main and auxiliary drive. This trend is natural. In Fairbanks-Morse Two-Cycle Airless Injection Engines—built by the largest Diesel manufacturers in the United States—the basic advantages of Diesel construction are brought to their highest point of efficiency. The advantages of F-M Diesel power for fishing vessels are sketched briefly on the following page. You will be interested. Definite facts regarding the savings and improved efficiency which Fairbanks-Morse Diesel power makes possible are available, without obligation to you.



FAIRBANKS-MORSE
DIESEL ENGINES
POWER, PUMPING AND WEIGHING EQUIPMENT



Charted waters

1930
begins the
SECOND CENTURY
of building
FAIRBANKS SCALES

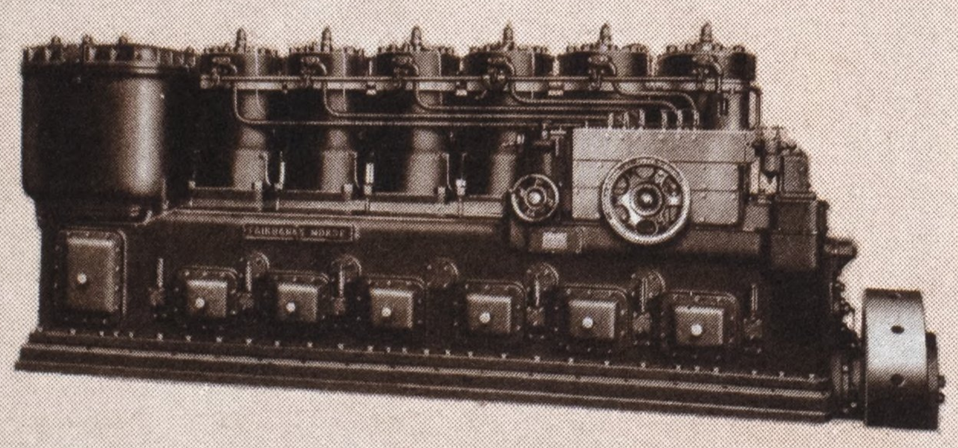
Looming ever larger on the marine power horizon, is the Fairbanks-Morse Diesel Engine—a trusty beacon that guides craft into the Port of Economical Power. The course is marked. Results are sure.

Records of F-M Diesel performance—both as main drive and auxiliary power—prove that these perfected, two-cycle engines are capable of cutting costs tremendously. They burn cheap fuel oil, reduce maintenance and operating attention, eliminate stand-by losses. Other advantages include immediate starting, small space requirement per horsepower and greatly increased cruising range.

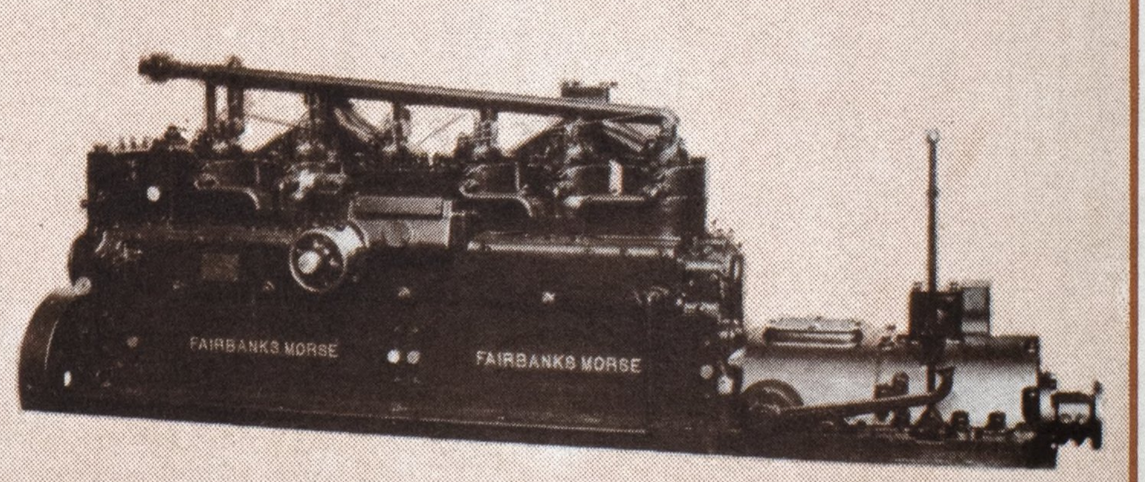
Fairbanks-Morse Diesel Engines are built in several models and in many sizes from 25 to 1200 hp. Thus there is an F-M Diesel to suit the main drive and auxiliary requirements of most types of craft. Builders and owners find it advantageous to use F-M Motors, Generators and Pumps— as well as F-M Diesels—thereby centralizing responsibility in *one* dependable organization. Fairbanks-Morse service stations are located in principal ports the world over—facilities unequaled by those of any other American manufacturer of Diesel engines.

F-M engineers are always available for consultation regarding power requirements in the conversion of existing vessels or the building of new ones.

FAIRBANKS, MORSE & CO., Chicago
Branches with Service Stations in Principal Ports



Pump scavenging Model 37 Marine Diesel with oil cooled pistons and continuous pressure lubrication. Sizes from 250 to 1200 HP.

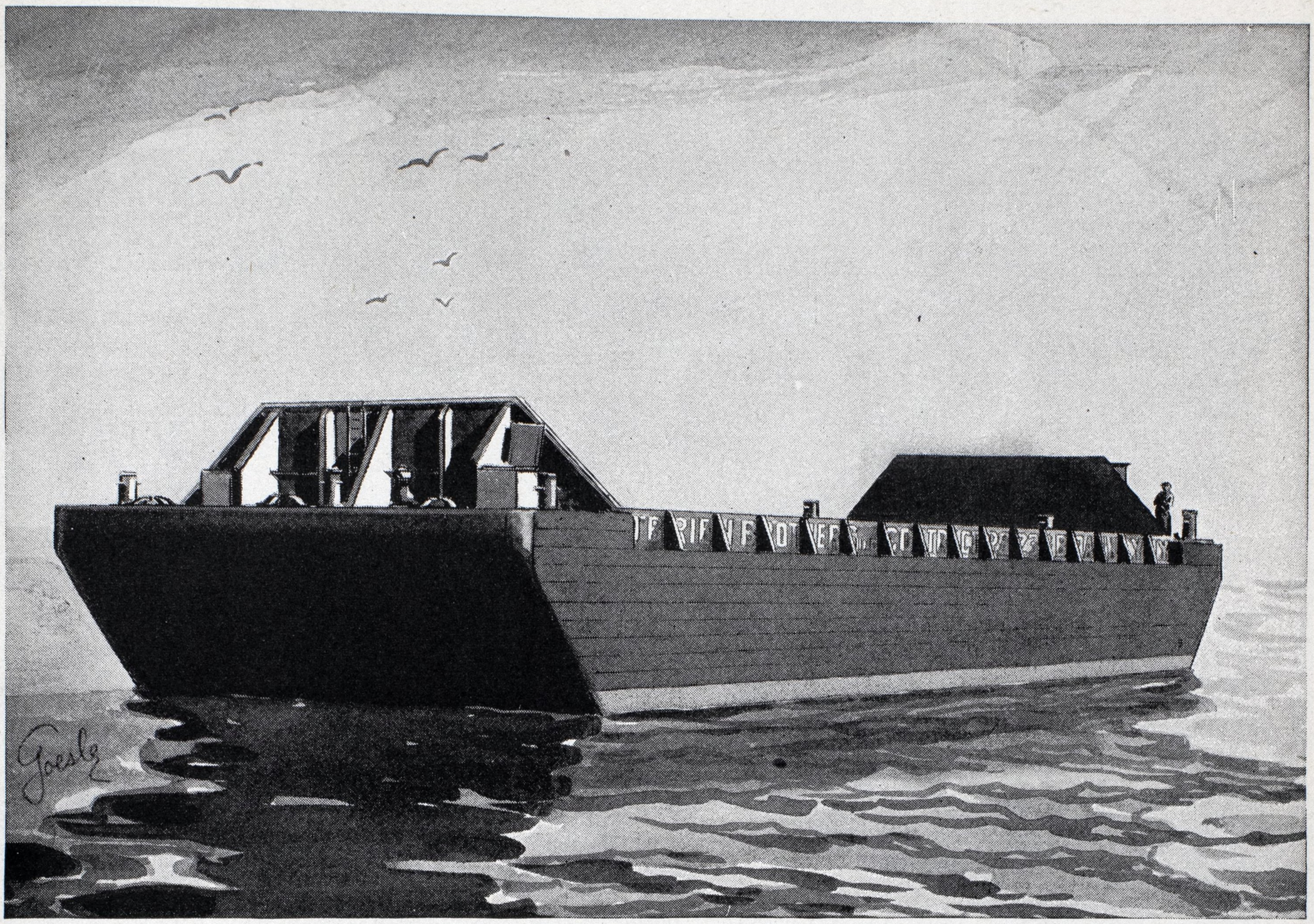


Model 34 Marine Diesel with gear type transmission and reverse gear. Sizes from 25 to 70 H. P. Other Models in sizes from 75 to 360 HP.

FAIRBANKS-MORSE
DIESEL ENGINES
POWER, PUMPING AND WEIGHING EQUIPMENT

FEDERAL BARGES

FEDERAL WELDED BARGES



SATISFY EVERY REQUIREMENT

Design adopted after several years investigation...Over 50 miles of welding performed on scows, oil barges and lighters of this design...75 per cent of the welding is done by automatic machinery, securing uniform and precise workmanship...Underwater surfaces doubly sealed by welding on outside and inside.

Damage repairs simple, wherever hand welding is available.

FEDERAL SHIPBUILDING AND DRY DOCK COMPANY

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SUBSIDIARY OF UNITED STATES STEEL CORPORATION

WELIN-MACLACHLAN
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are being fitted on the two Ward Liners building at Newport News, and the Grace Liner, "Santa Clara", building at Camden, New Jersey.

In addition, Gravity Davits are specified on most of the large liners building both here and abroad.

View of a Modern Boat-deck.

WELIN DAVIT & BOAT CORPORATION

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THE INTERLAKE STEAMSHIP CO.

— reduces your overall operating cost, guarantees more continuous dependable service, and means less work for your operating engineers.

That's the second reason why leading operators on river, lake and ocean consistently specify and buy Engberg Marine Generating Sets. They know from actual experience.

Your costs on the new or present vessels can be cut by using Engberg. Send for the new Marine Bulletin No. 1901.

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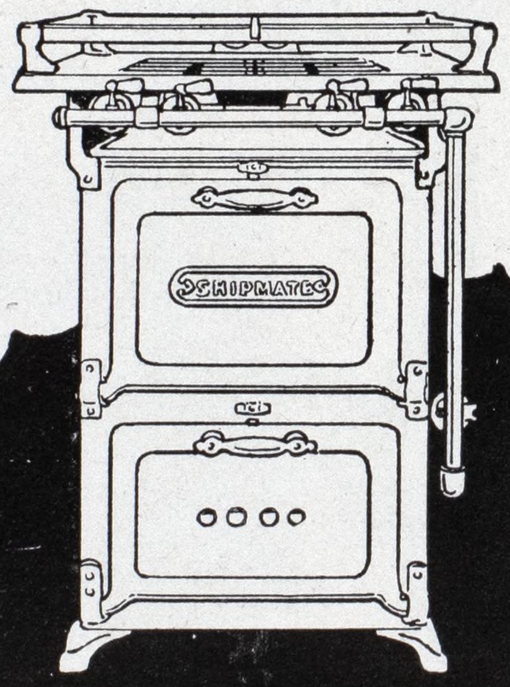
IMPROVED MARINE GENERATING SETS

Home Cooking at Sea!



SHIPMATE

With a SHIPMATE aboard, the question of the galley range is settled for all time. Experienced sailors know that a SHIPMATE provides all the convenience of the kitchen range at home whether you want to burn coal, wood, briquets, oil or gas.

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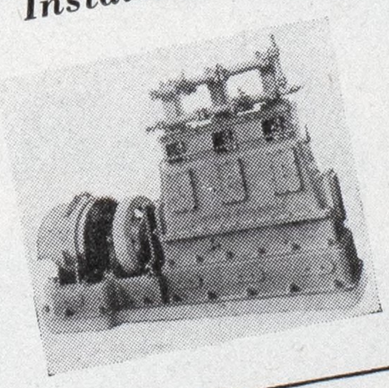
STAMFORD, CONN.

Yours for the Asking

Write to our Marine Department at New Brunswick, N. J., asking for a free copy of the article "Refrigeration Equipment on the S. S. *California*." It gives an interesting description of the installation of Brunswick-Kroeschell Refrigeration on the largest American built ship. Similar Brunswick-Kroeschell installations serve the *Virginia* and the new *Pennsylvania*, sister ships to the *California*.

"The Standard for All Marine Installations"



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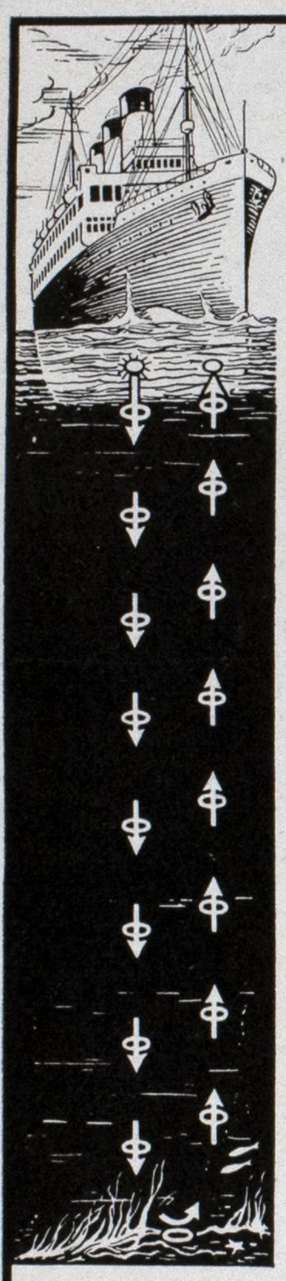

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VISUAL ECHO SOUNDINGS

MODERN sounding equipment and its use when "on soundings" are of vital importance to the safe navigation of every ship.

The Fathometer meets the most exacting demands for modern sounding equipment. Many soundings a minute, flashing upon the Fathometer dial, give constant and accurate knowledge of depth. Safe and efficient navigation is assured; time and labor saved.

Fathometer installations have been made upon a large number of passenger and cargo vessels including—

S. S. Leviathan-Mauretania-Columbus

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Submarine Signal Company
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Fathometers *for* Echo Sounding
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Shipments are handled with less labor and in quicker time where Truscon Steel Boxes, Skid Platforms and Six-Wheel Factory Trucks are used. They are furnished in types and sizes to meet every condition. Our engineers will give full information and useful suggestions.

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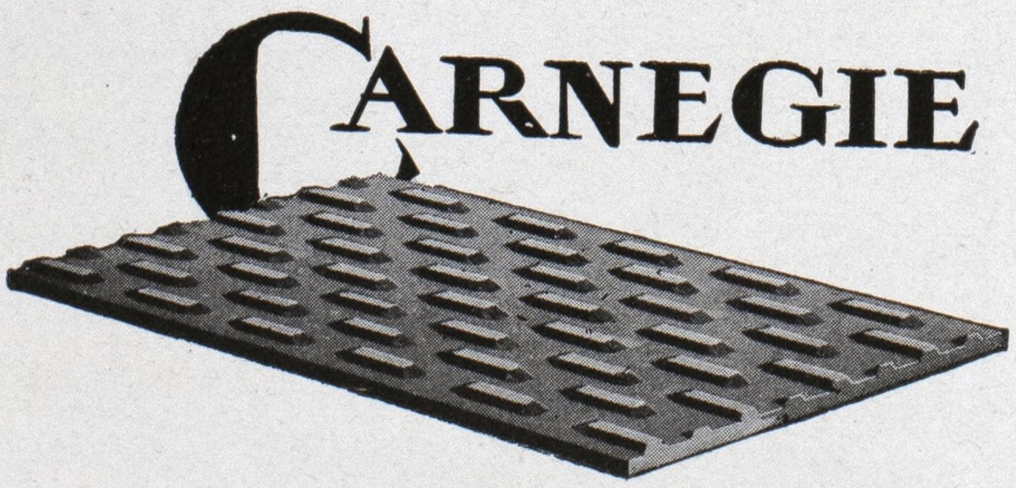
PRESSED TRUSCON & DRAWN STEEL

CARNEGIE FLOOR PLATE



Section M-41
Thickness—$\frac{3}{16}$" to $\frac{3}{4}$" exclusive of raised figure.
Width —6" to 66".
Weight —8.8 to 31.7 pounds per square foot.
Recommended for floors, sidewalk openings, stair and traffic treads, where a safe, secure foothold is required. This design drains and cleans easily.

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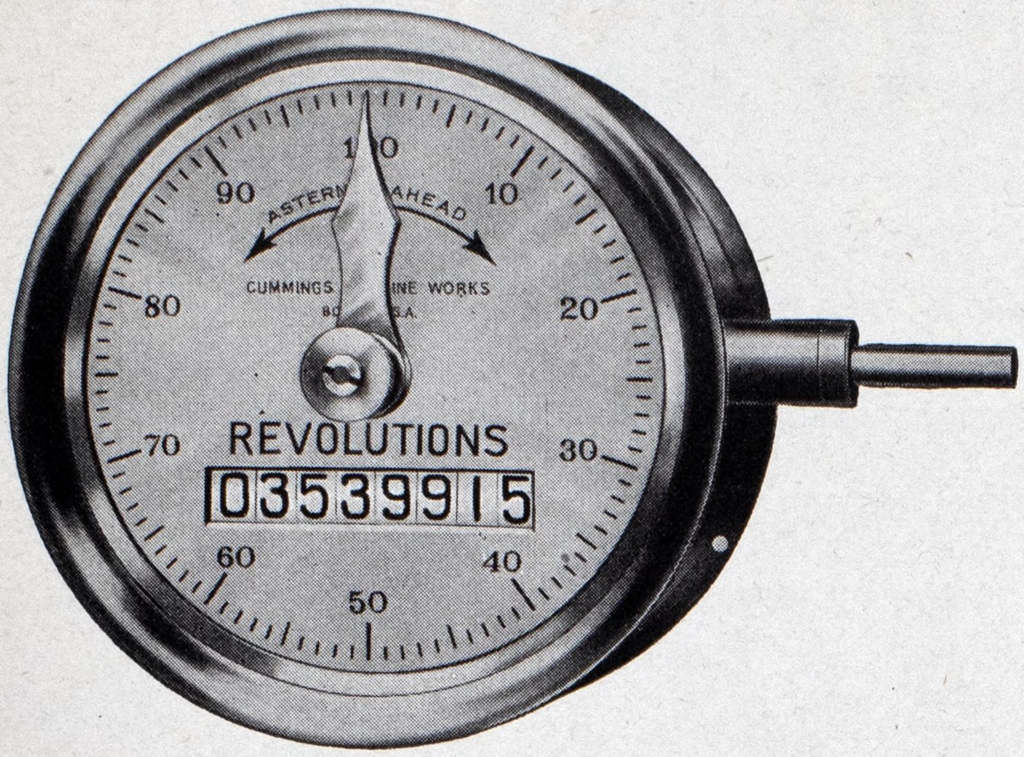
CARNEGIE BUILDING, PITTSBURGH, PA.

Cummings

Combination Counter & Telltale



Adopted by the Panama Pacific Line on
S. S. California
S. S. Virginia
S. S. Pennsylvania

Cummings Revolution Counters and
Gary-Cummings Torsion Meters

have been used on
U. S. Naval Vessels Since 1912

Cummings Machine Works

255 Atlantic Ave., Boston, Mass.

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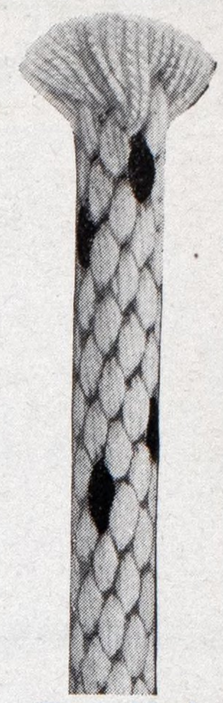
Log Lines

Smooth, tough and durable; no adulterating material to stiffen it and decrease strength and durability. Solid braided of extra quality cotton yarn. Uniform in size and quality. Easily identified by the colored spots, our trade mark.

We also manufacture flag halyards, lead lines, tiller rope; solid braided cotton cord in all sizes for various marine uses. Ask for catalog and samples.



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SAMSON CORDAGE WORKS

88 BROAD STREET BOSTON, MASS.

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MARINE PUMPS

"The Dean of Pumps on Land and Sea"

Single Style & Duplex
Piston Type & Plunger

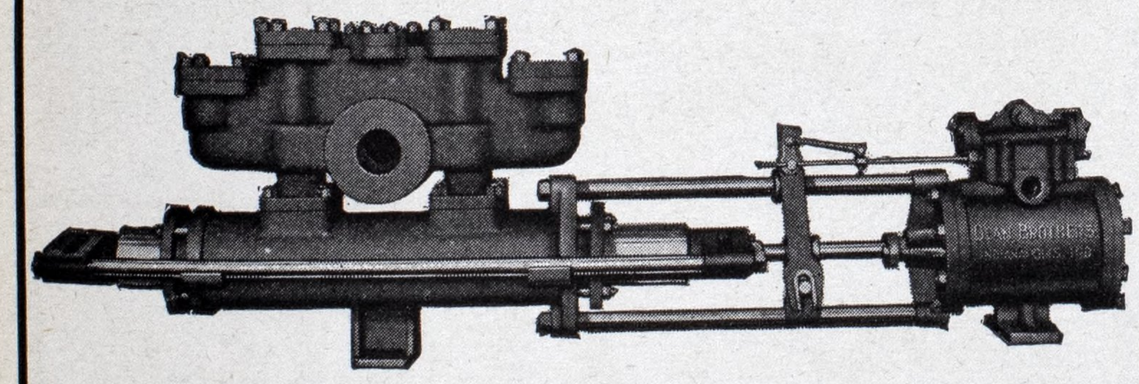

Figure No. 2311 Horizontal Single Style Double Acting Outside End Packed Plunger Trombone Pot Valve Pump For Boiler Feed & Pressure Service.

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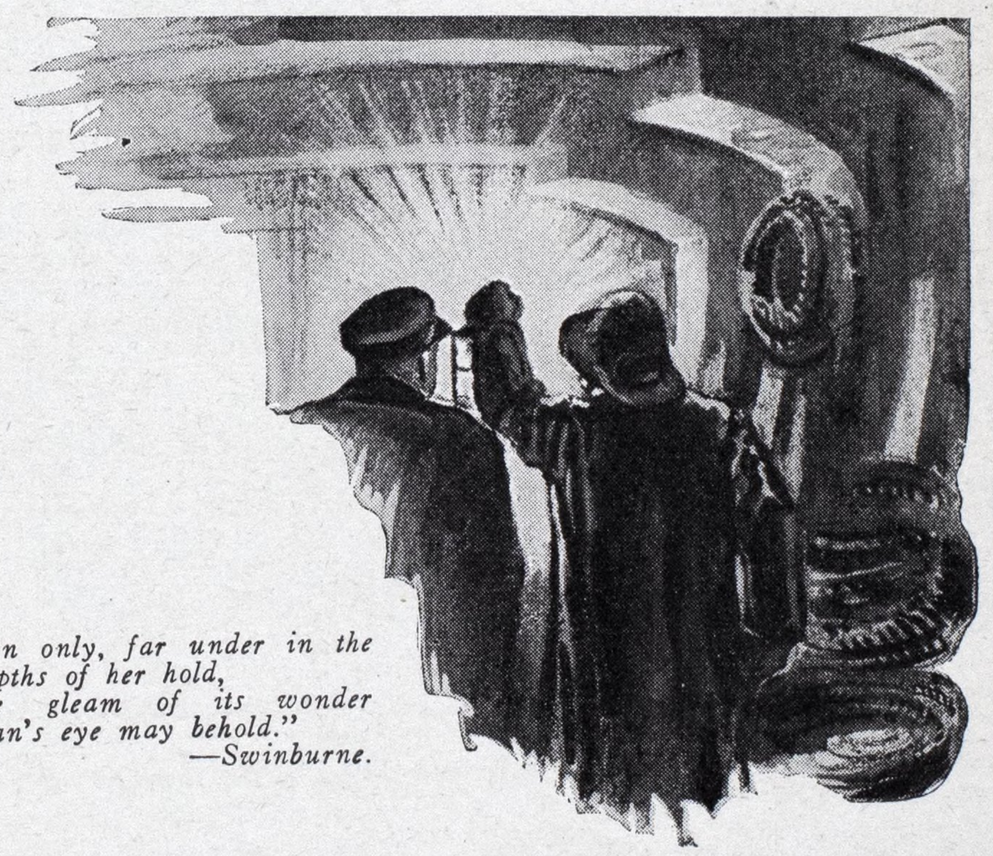

"Then only, far under in the depths of her hold,
Some gleam of its wonder man's eye may behold."
—Swinburne.

EACH beam, each well fitted timber, each sturdy rib and plank strong enough to stand the wildest gale,—and she's tight if properly caulked.

The experienced sailor knows the value of tight seams—no one need tell him that—but thousands of ships on the seven seas assure him that his seams will be *tighest* when caulked with

STRATFORD OAKUM

For almost a century Stratford Oakum has caulked the seams of the finest vessels that sail the seas. Be sure you get genuine Stratford Oakum. There is no other "just as good."

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Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Great Lakes Engineering Works, River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Oldman-Magee Boiler Works, Inc., 36-40 Illinois St., Buffalo, N. Y.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Toledo Shipbuilding Co., Toledo, O.

BOILERS (Water Tube)
Almy Water Tube Boiler Co., 184 Allen St., Providence, R. I.
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOOKS (Technical)
Penton Publishing Co., Cleveland, O.

BROKERS (Vessel)
Boland & Cornelius, Marine Trust Bldg., Buffalo, N. Y.
Farley, Edward P., & Co., Inc., 11 Broadway, New York City.

BRAKES (Electric)
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

BUNKER FUEL OIL—See FUEL OIL

BURNERS (Oil)—See OIL BURNING EQUIPMENT

CABLES
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co., 46 South St., New York City.

CALCIUM CARBIDE
Union Carbide Sales Co., 30 E. 42nd St., New York City

CALKING COTTON
Stratford, Geo., Oakum Co., 165 Cornelison Ave., Jersey City, N. J.

CAPSTANS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

CAR FLOATS
American Bridge Co., 71 Broadway, New York City.

CARBIC
Union Carbide Sales Co., 30 E. 42nd St., New York City

CARBIC FLOODLIGHTS
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

CARBIDE
Union Carbide Sales Co., 30 E. 42nd St., New York City

CASTINGS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Great Lakes Engineering Works, River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.

CASTINGS (Iron)
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.

COMBINATION COUNTER AND TELLTALE
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.

COMPASSES
Ritchie, E. S., & Sons, Brookline, Mass.

COMPASSES (Gyro)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

COMPRESSORS
Brunswick-Kroeschell Co., New Brunswick, N. J.
Ingersoll-Rand Co., 11 Broadway, New York City.

CONDENSERS
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

CONTRAPROPELLER
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.

CONTRARUDDER
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.

CONTROLLERS (Electric)
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

CORDAGE
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston, Mass.
Whitlock Cordage Co., 46 South St., New York City.

CUTTING APPARATUS (Oxy-Acetylene, Oxy-Gas)
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

DAVITS
Welin Davit & Boat Corp., 3-5 Vernon Ave., Long Island City, N. Y.

DECKING COVERING
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

DEPTH FINDERS
Submarine Signal Co., 160 State St., Boston, Mass.

DIE BLOCKS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

DIE STEELS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

DIESEL ENGINES—See ENGINES (Diesel)

DIESEL FUEL OIL—See FUEL OIL

DISSOLVED ACETYLENE
Prestolite Co., The, Inc., 30 E. 42nd St., New York City

DISTILLING APPARATUS
Griscom-Russell Co., 285 Madison Ave., New York City.

DIVING APPARATUS
Morse, Andrew J., & Son, Inc., 221 High St., Boston, Mass.

DRAFT (Artificial and Mechanical for Boilers)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Great Lakes Engineering Works, River Rouge, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

DREDGING MACHINERY
Great Lakes Engineering Works, River Rouge, Mich.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

DRINKING FOUNTAINS
Haydenville Co., The, Haydenville, Mass.

DRY DOCKS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.

DYNAMOS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

EJECTORS (Ash)
Great Lakes Engineering Works, River Rouge, Mich.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

ENGINE SPEED INDICATORS
Sperry Gyroscope Co., The, Brooklyn, N. Y.

ENGINEERS (Marine, Mechanical and Consulting)
Canada Steamship Co., P. O. Box 2430, Montreal, Can.
Great Lakes Engineering Works, River Rouge, Mich.
Todd Shipyards Corp., 25 Broadway, New York City.
United Dry Docks, Inc., 11 Broadway, New York City.

ENGINES
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.

ENGINES (Diesel)
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.

ENGINES (Internal Combustion)
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The, Grove City, Pa.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.

ENGINES (Marine)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Bethlehem, Pa.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Canada Steamship Lines, P. O. Box 2430, Montreal, Can.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sturtevant, B. F., Co., Inc., Hyde Park, Boston, Mass.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

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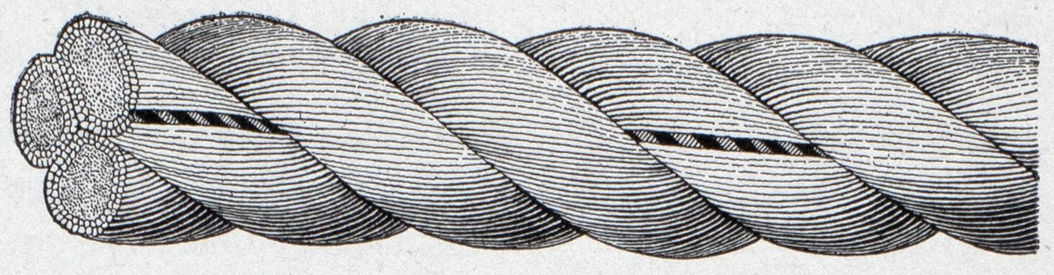

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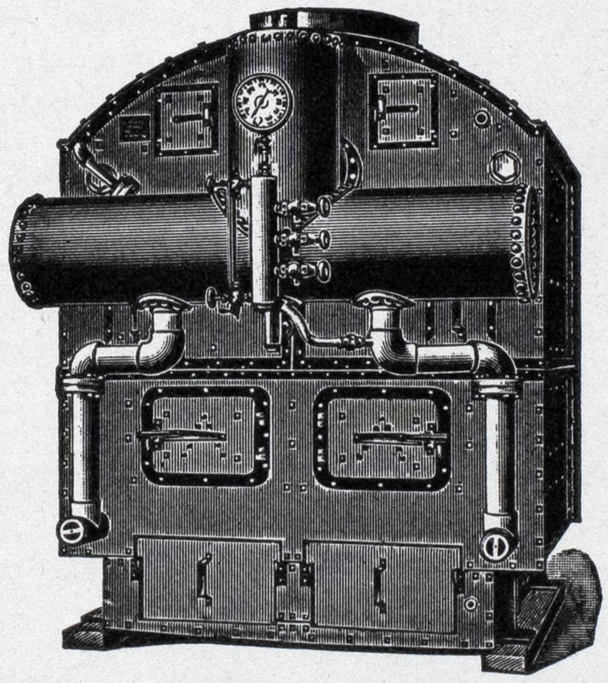

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Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Ingersoll-Rand Co., 11Broadway, New York City.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.

ENGINES (Steam, Steering)
Dake Engine Co., Grand Haven, Mich.

ENGINES (Vertical, Enclosed, Self Oiling)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.

EUROPEAN STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Line 39 Broadway, New York City.

EVAPORATORS
Griscom-Russell Co., 285 Madison Ave., New York City.

FANS (Electric)
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

FEED WATER HEATERS—See HEATERS AND PURIFIERS (Feed Water)

FEED WATER REGULATORS
Babcock & Wilcox Co., 85 Liberty St., New York City.

FLOORING
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

FLOOR PLATES
Carnegie Steel Co., Carnegie Bldg., Pittsburgh, Pa.

FORGING BILLETS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

FORGINGS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

FOUNDERS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
New York Shipbuilding Co., Camden, N. J.

FREIGHT SERVICE
Hamburg-American Line, 39 Broadway, New York City.

FUEL OIL
Texas Co., The, 17 Battery Place, New York City
Vacuum Oil Co., 61 Broadway, New York City.

FURNITURE
Marble & Shattuck Chair Co., 10200 Foster Ave., Cleveland, O.

FURNITURE (Metal)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

GALLEY RANGES
Stamford Foundry Co., Stamford, Conn.

GEARS (Marine Equipment)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

GENERATING SETS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

GENERATING SETS (Direct Connected)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

GENERATORS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

GRAPHITE
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE GREASES
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE PAINT
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE PIPE JOINT COMPOUNDS
Dixon, Jos., Crucible Co., Jersey City, N. J.

GREASE
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City

GREASE (Launching)
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City

GYRO-PILOT (Automatic Steering)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

HAMMER RAMS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

HARDWARE (Marine)—See MARINE HARDWARE

HATCH FASTENERS
Mullholland Hatch-Fastener Co., Marion Bldg., Cleveland, O.

HAWSERS (Manila)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

HEATERS AND PURIFIERS (Feed Water)
Davis Engineering Co., 90 West St., New York City.
Griscom-Russell Co., 285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

HEATING EQUIPMENT
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

HEATING STOVES
Stamford Foundry Co., Stamford, Conn.

HOISTING ENGINES
Hyde Windlass Co., Bath, Me.

HOISTS (Air)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Ingersoll-Rand Co., 11 Broadway, New York City

INDICATORS (Direction & Revolution)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

INDICATORS (Helm Angle)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

INDICATORS (Speed)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

ICE MACHINES—See REFRIGERATING MACHINERY

INSURANCE (Marine)
Boland & Cornelius, Marine Trust Bldg., Buffalo, N. Y.

IRON (Bar)
Wrought Iron Co. of America, Lebanon, Pa.

IRON (Engine Bolt)
Wrought Iron Co. of America, Lebanon, Pa.

IRON (Staybolt)
Wrought Iron Co. of America, Lebanon, Pa.

LAMPS (Mazda and Arc)
General Electric Co., Schenectady, N. Y.

LIFEBOATS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp., 3-5 Vernon Ave., Long Island City, N. Y.

LIFESAVING EQUIPMENT
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

LIGHTING EQUIPMENT
Westinghouse Electric & Mfg. Co. S. Philadelphia, Pa.

LUBRICATING OIL
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

MACHINERY (Marine)
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Cooper-Bessemer Corp., The, Grove City, Pa.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc. Wis.
Maryland Dry Dock Co., Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

MACHINES (Sounding)
Submarine Signal Co., 160 State St., Boston, Mass.

MACHINISTS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts., St. Louis, Mo.
New York Shipbuilding Co., Camden, N. J.

MAGNETS (Lifting)
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)

MATERIAL HANDLING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

MATTRESSES
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

METERS (Gas & Air)
Cutler-Hammer, Inc., 1265 St. Paul Avenue, Milwaukee, Wis.

MOTOR GENERATOR SETS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

MOTORS (Electric)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NAUTICAL INSTRUMENTS
Ritchie, E. S., & Sons, Brookline, Mass.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

NAVIGATING INSTRUMENTS
White, Kelvin & Wilfrid O., Co., 112 State St., Boston, Mass.

NITROGEN
Linde Air Products Co., 30 East 42nd St., New York City

OAKUM (Marine, Rope, Packings, Plumbers)
Stratford, George, Oakum Co., 165 Cornelison Ave., Jersey City, N. J.

OIL BURNING EQUIPMENT
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

OIL FOR ALL PURPOSES (Marine)
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

OXY-ACETYLENE APPARATUS
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

OXYGEN
Linde Air Products Co., 30 East 42nd St., New York City.

PAINT BURNERS (Acetylene)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

PASSENGER SERVICE
Hamburg-American Line, 39 Broadway, New York City.

PISTON RODS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

PLATES (Sheared Steel)
Alan Wood Steel Co., Conshohocken, Pa.

PLATES (Steel Floor)
Alan Wood Steel Co., Conshohocken, Pa.

PLATFORMS (Skid)
Truscon Steel Co., Pressed Steel Div., Youngstown, Ohio.

PORTABLE LIGHTS (Acetylene)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

PROPELLER BLADES AND HUBS
Sheriffs Mfg. Co., Milwaukee, Wis.

PROPELLER WHEELS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works, River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.
Trout, H. G. Co., 220 Ohio St., Buffalo, N. Y.

PROPELLERS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.

PULVERIZED COAL BURNERS
Todd Shipyards Corp., 25 Broadway, New York City.

PUMPS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.
Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.

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Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

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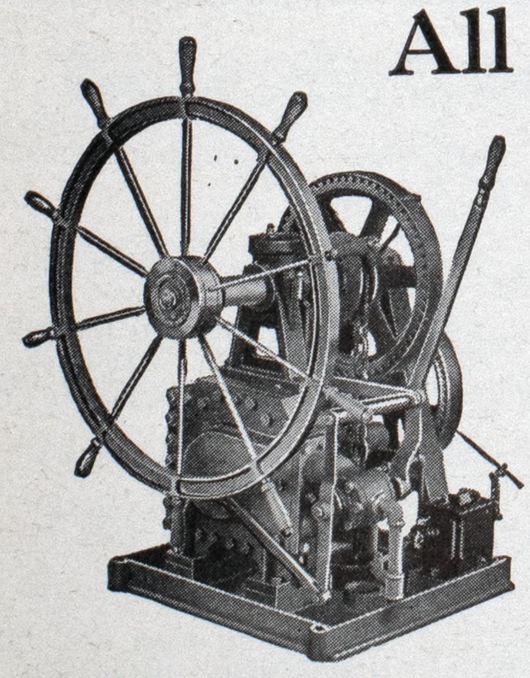

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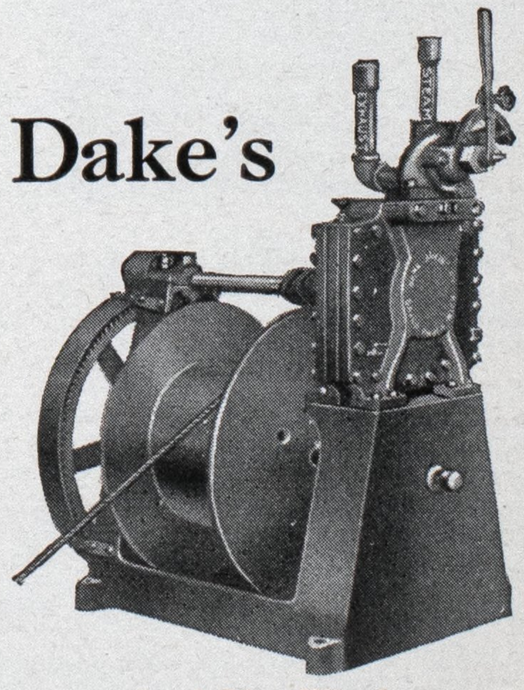
Dake Engine Co., GRAND HAVEN, MICHIGAN



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PUMPS (Bilge)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

PUMPS (Boiler Feed)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

PUMPS (Direct Acting)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.

PUMPS (Power)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

PUMPS (Steam)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

PUMPS (Vacuum)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

RADIO COMPASS AND DIRECTION FINDER
Radiomarine Corp. of America,
66 Broad St., New York City.

RADIO EQUIPMENT
Radiomarine Corp. of America,
66 Broad St., New York City.

RAFTS
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St.,
Brooklyn, N. Y.

RANGES
Stamford Foundry Co.,
Stamford, Conn.

REFRIGERATING MACHINERY
Brunswick-Kroeschell Co.,
New Brunswick, N. J.
Ingersoll-Rand Co.,
11 Broadway, New York City

REPAIRS
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Maryland Dry Dock Co.,
Baltimore. Md.

REPAIRS (Electric)
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

REPAIRS (Marine)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Canada Steamship Lines,
P. O. 2435, Montreal, Can.
Chicago Shipbuilding Co.,
So. Chicago, Ill.
Collingwood Shipyards, Inc.,
Collingwood, Ont., Canada.
Great Lakes Engineering Works,
River Rouge, Mich.
Manitowoc Ship Building Corp.,
Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc.,
11 Broadway, New York City

REPAIRS (Marine Engine)
Collingwood Shipyards, Inc.,
Collingwood, Ont., Canada.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.

REPAIRS (Turbine)
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

REVOLUTION COUNTERS
Cummings Machine Works,
255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co.,
Manhattan Bridge Plaza,
Brooklyn, N. Y.

RIVETS
Wrought Iron Co. of America,
Lebanon, Pa.

RINGS (Steel)
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

ROLLS (Steel)
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co.,
46 South St., New York City.

ROPE (Transmission)
Columbian Rope Co., Auburn, N. Y.

ROPE OAKUM
Stratford, George, Oakum Co.,
Jersey City, N. J.

RUBBER TILE
Selby, Battersby & Co.,
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Vacuum Oil Co., 61 Broadway,
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Toledo Shipbuilding Co., Toledo, O.

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Sperry Gyroscope Co., The,
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Sperry Gyroscope Co., The,
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Smith, Leathem D., Dock Co.,
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Heppenstall Co.,
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Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
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Great Lakes Engineering Works,
River Rouge, Mich.
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Manitowoc Ship Building Corp.,
Manitowoc, Wis.
Maryland Dry Dock Co.,
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Smith, Leathem D., Dock Co.,
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Chester, Pa.
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Truscon Steel Co., Pressed Steel Div., Youngstown, O.

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STEEL TANKS
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STEERING GEARS
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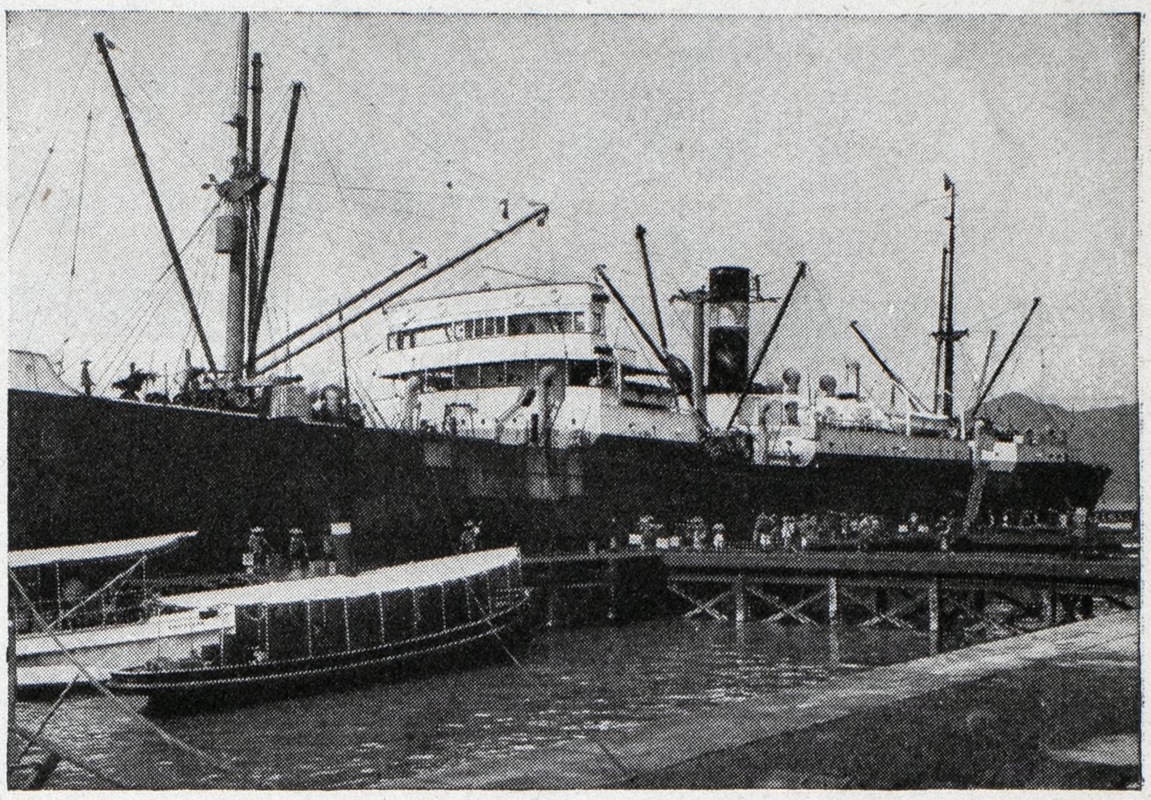

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THE new American Merchant Marine brings true American efficiency to overseas freight transportation. Daily the men and ships of this great fleet establish new records of speed, service and dependability in handling cargoes of all kinds to and from every corner of the earth.

Made up of the hundreds of vessels in the 17 lines owned by the United States Shipping Board and those in the many others developed by the Shipping Board but now under private ownership, this new Merchant Marine offers unrivalled shipping facilities for both manufactured goods and raw materials. Speedy ships maintain regular schedules to practically every port of importance in the world.

The advice and counsel of the experienced American operators of the Shipping Board lines are at your command at all times. These experts will be glad to help you solve any transportation problems. Write for full information.

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"SWEDEROPE"
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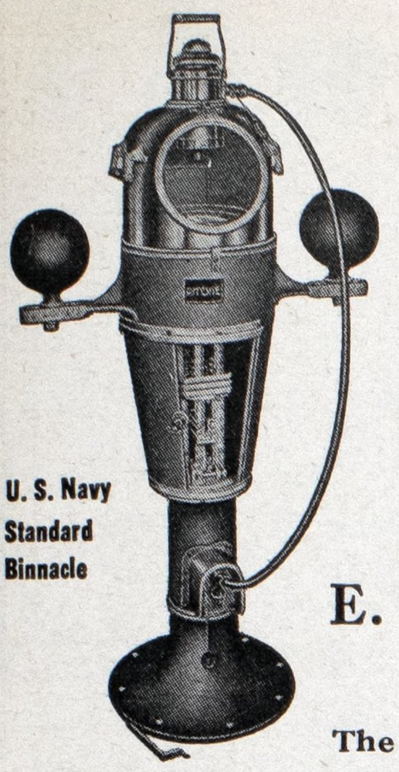
If you want to buy or sell ships or marine equipment—need a man for your organization—make it known to the entire marine industry through the use of classified advertising in MARINE REVIEW.

Mail copy for your advertisement in the April issue today, so it reaches us before March 20.



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Standard
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The Standard Liquid Compass the world over.

Used Exclusively in U. S. Navy for over 40 years.

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Made in all sizes 2 to 12" dia.

Magnets for adjusting Purposes.

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Agents for the Great Lakes,
The Upson-Walton Company, Cleveland, Ohio

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WERE SUPPLIED TO THE

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C. M. Lane Lifeboat Co., Inc.
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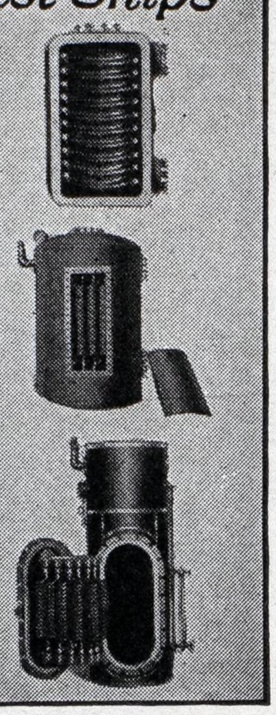
Standard on the World's Greatest Ships

Paracoil
MARINE EQUIPMENT



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Self Propelled and Self Unloading River Boats

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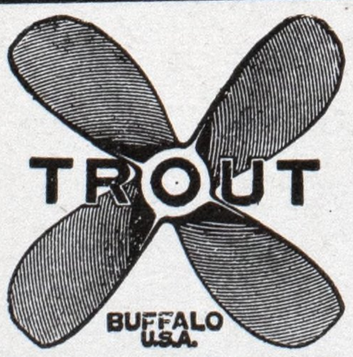

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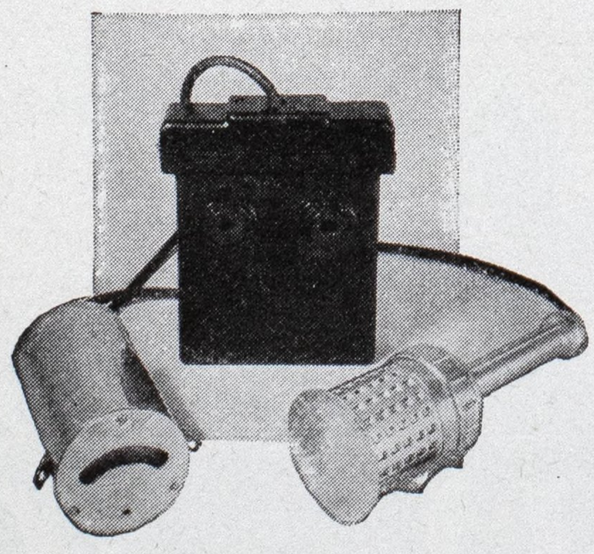
The Invisible Hazard

SEEING is 99 per cent of accident prevention. The workman who can see the hazards around him has a chance to take safety precautions.

But he cannot protect himself against the treacherous hazard which creeps in and surrounds him silently and invisibly—flammable gas.

The U.C.C. Combustible Gas Indicator protects this workman. It does not depend on samples. It is carried into the atmosphere to be tested, and gives immediate warning of the presence of flammable gases

Return the coupon below for booklet describing the U.C.C. Indicator and its applications.



The U.C.C.
Combustible Gas Indicator

Distributed by

UNION CARBIDE SALES COMPANY

Unit of Union Carbide UCC *and Carbon Corporation*

NEW YORK CHICAGO SAN FRANCISCO

and

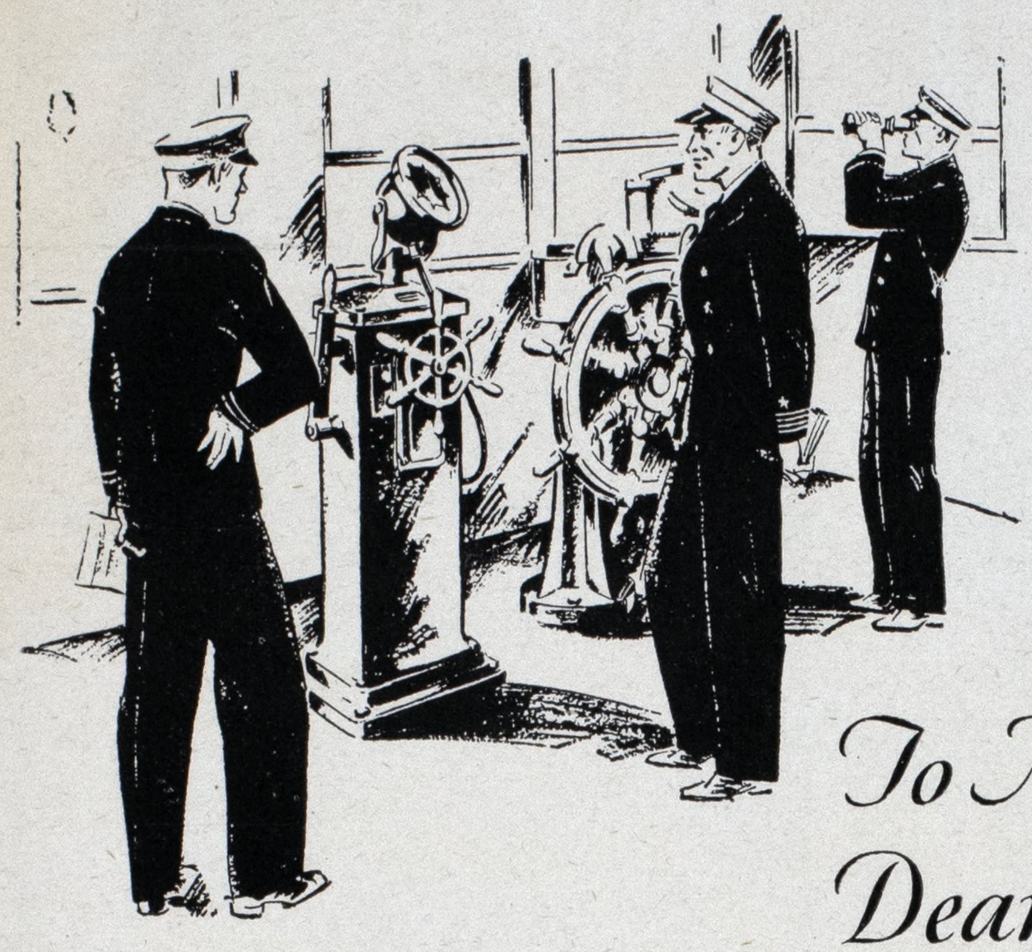
BULLARD-DAVIS, INC. NEW YORK SAN FRANCISCO

Union Carbide Sales Co., Safety Appliance Department, 30 East 42nd St., New York, N. Y.
Please send me your new booklet about the U. C. C. Combustible Gas Indicator.

Name ..... *City* .....

Street and Address ..... *State* .....

HE GOT THE JOB



To My Employer,

Dear Sir:

Well, here we are in Buenos Aires! I am proud that you gave me this opportunity to prove my worth. The first time they gave me the responsibility of steering the ship all the officers, including the Captain, were present. It only took them a short time to learn the best adjustments for me.

They have all commented on her as being a hard ship to handle but, by always being alert and never letting her "get away" from me I have found her very easy to steer. And, could you believe it! This ship has found .2 of a knot in her that she never knew she had, and only because I was careful not to use a degree more of rudder than was absolutely necessary to hold her accurately to the course.

The accompanying sketch was done by one of our mates. He sketched this when they were all watching me start my first trick at the wheel.

I will write you again after we have completed the next leg of our voyage. Yours to command.

Sperry Gyro Pilot

Address

SPERRY GYROSCOPE CO., Inc.
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Brooklyn, New York

HE GOT THE JOB

Under Construction at—
Newport News

The Largest and Highest Powered American—Built Liners

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In placing this contract the Dollar Steamship Lines, Ltd., Inc. gave careful consideration to the yard facilities—scientific organization and the character of the ships built at Newport News as well as the excellent design of the vessels proposed for their requirements.

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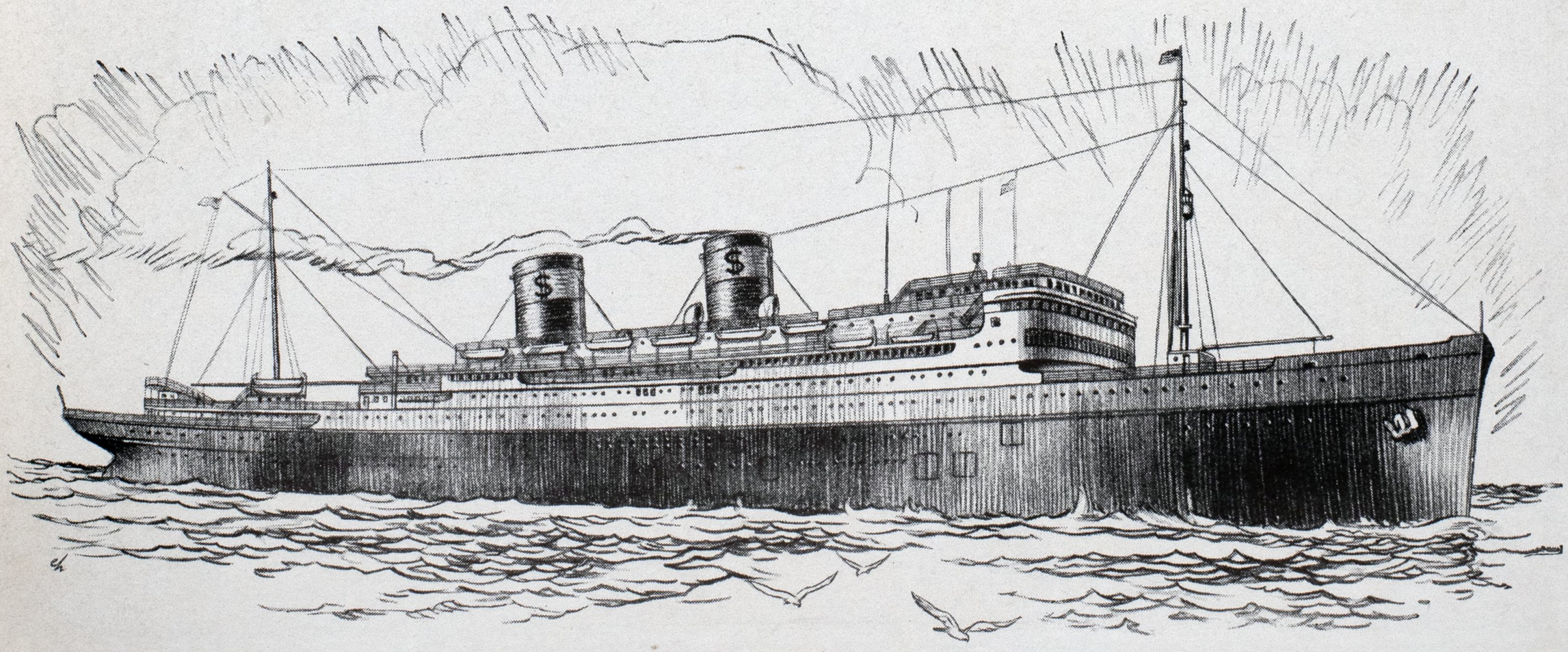
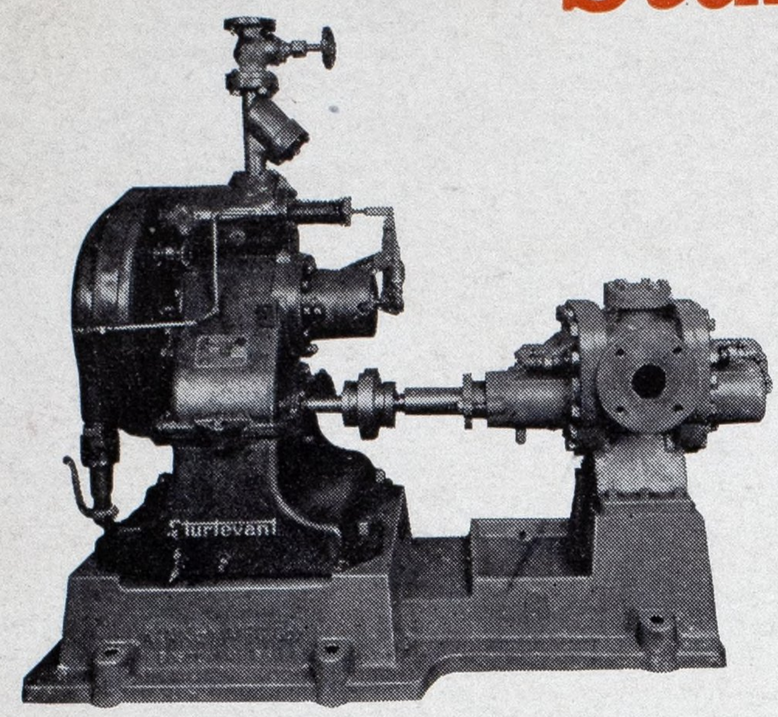
Newport News Shipbuilding and Dry Dock Company

Newport News, Va. 233 Broadway, New York City



Sturtevant Turbo Transmissions



Sturtevant oil pump. Turbo Transmission connected to fuel Designed for 4000 R. P. M. on pinion and 400 R. P. M. on gear.

The efficient and dependable operation of Sturtevant Turbo Transmissions have been proved by the many years of continuous service on a large number of ships. Both merchant and naval boats have these units operating in various capacities with most economical results.

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Hyde

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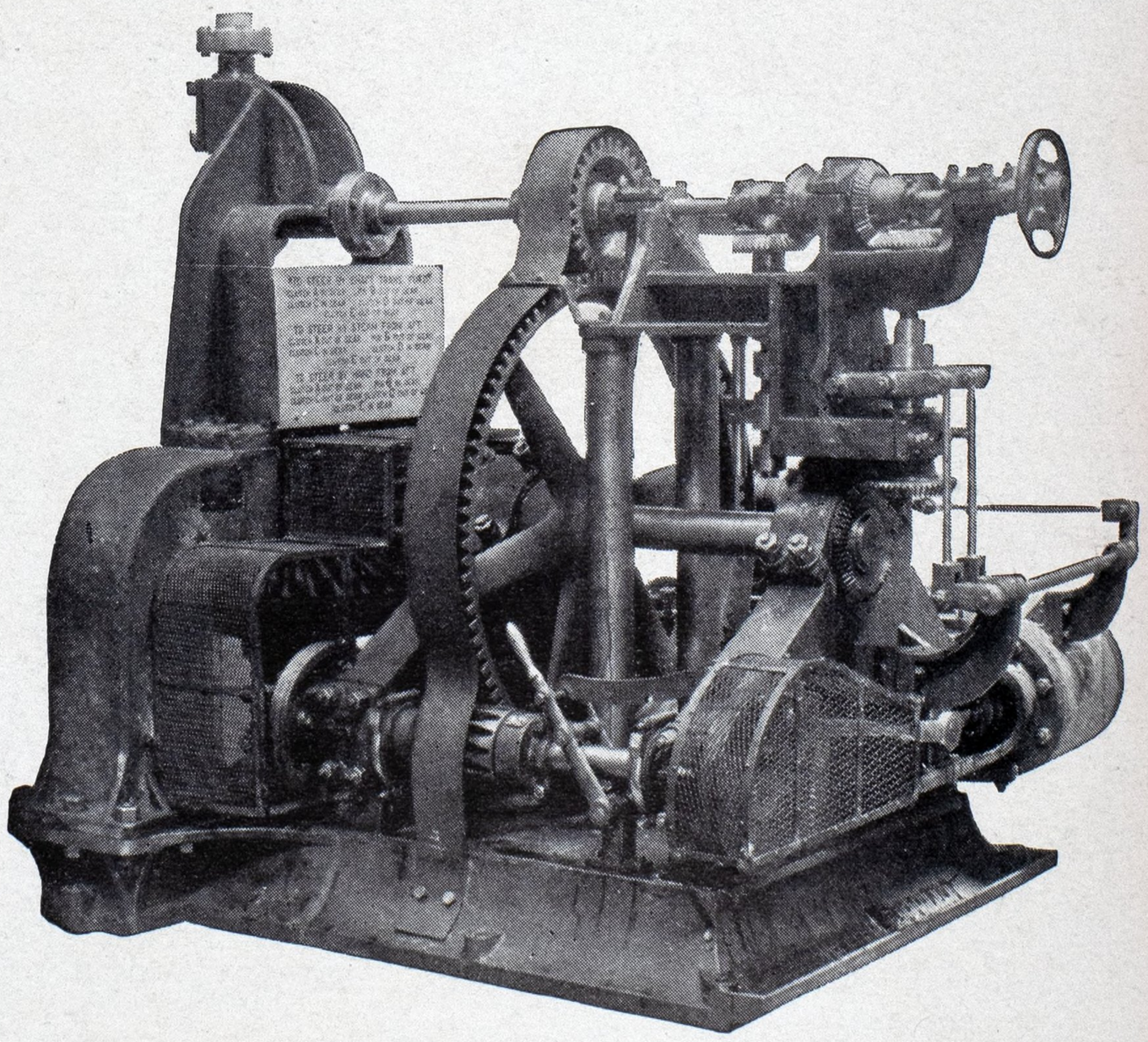
S. S. "B. F. AFFLECK" owned by Pittsburgh Steamship Co. and built by Toledo Shipbuilding Co.

S. S. "S. T. Crapo" owned by Huron Transportation Co. and built by Great Lakes Engineering Works.

These three fine new boats are all equipped with

Hyde

Quadrant Type Steering Gear
Spur Gear Windlass
Mooring Winches
Hatch Winches



HYDE Quadrant Type Steering Gear

Hyde Windlass Company

Bath, Maine